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FORTY-SIXTH ANNUAL REPORT

OF THE

MASSACHUSETTS AGRICULTURAL COLLEGE.

PART I.

REPORT OF THE PRESIDENT AND OTHER OFFICERS

FOR FISCAL YEAR ENDED NOV. 30, 1908.

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THE STATE BOARD OF PUBLICATION.

The Commonwealth of Massachusetts.

MASSACHUSETTS AGRICULTURAL COLLEGE,
AMHERST, Dec. 1, 1908.

To His Excellency EBEN S. DRAPER.

SIR: — I have the honor to transmit herewith, to Your Excellency and the Honorable Council, the forty-sixth annual report of the trustees of the Massachusetts Agricultural College, for the fiscal year ended Nov. 30, 1908.

I am, very respectfully, your obedient servant,

KENYON L. BUTTERFIELD,
President.

35027

REPORT OF THE PRESIDENT OF THE COLLEGE.

Gentlemen of the Corporation.

I herewith submit my third annual report as president of the college.

ATTENDANCE.

The attendance for the last college year exceeded that of the previous year by 25, and aggregated 246 four-years men and seven graduate students, with 245 in various short courses, or a total attendance of 498. The entering class in the autumn numbered 114, the largest previous freshman class being 88 in number. The total number of four-years men in present attendance is 263, and of graduate students 12. (See Table I.)

APPROPRIATIONS.

The total amount of appropriations asked of the Legislature of 1908 was about $111,390; the total amount granted was $91,617 for the fiscal year, with a further increase of $7,000 for 1909 and subsequent years. (See Table II.)

NEW GLASS HOUSES AND ATTACHED TEACHING BUILDING.

For several years the college has felt keenly the need of a range of modern glass houses adapted to instruction in commercial floriculture and market gardening. The need of a building suitable for teaching these branches has also been evident. The Legislature of 1908 made an appropriation of $34,000 for this purpose, the apportionment being approximately $15,000 for the instruction building, $17,000 for glass houses and $2,000 for the equipment of both. Plans for the range of greenhouses were drawn by Prof. E. A. White, with suggestions by the late W. W. Rawson of the Board of Trustees, and the contract for the construction was awarded to the Lord & Burnham Company, New York. The range is comprised as follows: —

Leading from the work room is a small house, 10 by 12 feet, which will be used for ferns. Next is a palm house 42 by 25 feet, to be used for the propagation and growth of the various varieties of palms. A narrow house for orchids, 10 by 12 feet, connects the palm house with the students' house, which is 50 by 26 feet. From the east end of the students' house an alley 12 by 112 feet serves to connect the other houses of the range; these are a violet house, a carnation house, a rose house, a tomato house and a cucumber house, each being 26 by 50 feet. The fern, palm, orchid, violet and students' houses, and the alley, are even span and of the iron type of construction; the other houses of the range are three-fourth span and of the half-iron type of construction. All are on concrete foundations, making a durable range. These houses will be heated by steam from the central heating plant.

The instruction building is a substantial two-story brick structure, with basement, designed by James H. Ritchie of Boston, and built by Allen Brothers of Amherst.

The basement contains a soil room, a cool room for bulbs, and storage rooms. The first floor contains a large laboratory with seating capacity for 50 students, a class room, coat room and office. The general work room for the glass houses joins the laboratory by double doors. On the second floor is a large class room with seating capacity for 100 students, a smaller class room, a room for the exhibition of greenhouse material and a janitor's room. The committee on buildings and grounds recommends that the building be known as "Henry F. French Hall," in honor of the first president of Massachusetts Agricultural College, and that the glass houses be called the "New Durfee Range of Glass Houses."

IMPORTANT REPAIRS TO COLLEGE BUILDINGS.

On account of the numerous repair projects at the opening of the building season, it was thought necessary to secure a foreman to take charge of the work, and Mr. Clarence A. Jewett was made superintendent of buildings. Large additions were made to the power house. The roof was taken off and another floor added, bringing the top floor to a level with the embankment. This additional floor has been enlarged, and contains a room for the use of the fire apparatus, and a large room that has been fitted up with a lathe, saw and woodworking tools, and will be used exclusively for the carpenters. The next room below, the old shop, will be used principally for the steam fitting and plumbing work. The work of remodelling this building was finished in the early summer, at a cost of $2,104.17. This included a new pump and planer, which were much needed.

North dormitory was renovated from cellar to garret. It was found necessary to take off all the old lath and plaster, and metal ceilings were installed throughout, the side walls being relathed and plastered with pulp plaster. The building was rewired, and two new side fixtures and one center light were placed in each study room. All windows were fitted with large new sash and glass. Maple floors were laid throughout the building. The dormitory rooms on the fourth floor were arranged for the use of the Q. T. V. Fraternity, which had formerly used rooms on the first floor. The rooms on the first floor were remodelled, and include one large room for the use of the Social Union, and two rooms for student organizations. The basement of the west end has been fitted for the use of the college store and barber shop, the remaining space being given to the toilets and baths, except the extreme east end, which is unfinished.

The east experiment station has been thoroughly repaired. A large, new, fireproof vault, size 11 feet 2 inches by 12 feet 3 inches, with three floors, made of brick and concrete, has been placed in the building. New maple floors in all rooms and Puritan floors in both main hallways, concrete floors in basement and two new toilet rooms complete, together with the painting of all woodwork and walls, put the building in fairly good condition. Some necessary repairs have been made at the west station, including repairs to skylight, cement floors in basement, eave troughs around entire building, with conductors connected with a new tile drain, besides sundry small jobs

Repairs to the library are still in progress. New cases ha been added, increasing the shelf capacity nearly one-third.

Numerous other repairs have been made during the summe and fall, the principal ones of which are: slate roof and painting, two coats, to outside of farmhouse; slate roof on farm cottage; shingle roof to quarantine barn; a new set of shower baths and hand bowls, with a cement floor, for south dormitory; two hundred feet of tar walk; and a cement-testing room for the mathematical department.

COMMENCEMENT.

Commencement was held June 17, and the college conferred the degree of Bachelor of Science upon 58 persons, 2 of them being women; the degree of Master of Science upon 1 man; and the degree of Doctor of Philosophy upon 1. The class of 1908 is by far the largest class ever graduated in the history of the college, the nearest approach to it in size being the class of 1904, with 34 members, and the class of 1882, with 33 members. Alumni Day was made a special feature of the commencement exercises. A vigorous and scholarly Commencement address was given on the subject of "True and False Appeals in Agriculture," by Dr. Whitman H. Jordan, director of the New York Experiment Station at Geneva.

THE SUMMER SCHOOL.

The summer school of 1908 presented several departures from the plan of 1907, these being mostly in the way of broadening the scope of the work: —

(1) A considerably larger number of courses was given. In 1907 the regular lecture courses numbered 4; in 1908 they numbered 19.

(2) The length of the school was extended from four weeks to six weeks.

(3) A separate and special effort was made to interest country clergymen in rural affairs. Four courses of lectures were offered for their especial benefit. This is probably the first attempt made in this country to offer a course of study on the rural problem to rural clergymen.

(4) The program included, further, a number of practical r technical courses designed more with reference to teaching practical matters than presenting subjects for direct use in school-rooms.

(5) This multiplication of courses rendered it necessary to

make all the work elective, and an effort was made to limit the amount of work taken by each pupil.

(6) The price of board and rooms furnished by the college was increased from $3 to $5 per week.

The increased cost of the course, assisted perhaps by other factors, reduced the attendance from 212 in 1907 to 168 in 1908.

A strong faculty was organized for the administration of these courses, including such eminent teachers as Prof. W. D. Hurd of the University of Maine, Prof. W. H. Dudley of the Wisconsin Normal School, Plattville, Wis., and Dr. T. N. Carver of Harvard. Several members of the faculty of Massachusetts Agricultural College also gave instruction.

There was a course of evening lectures and entertainments provided which proved interesting and valuable. Field exercises and excursions added much to the interest and value of the work.

Prof. F. A. Waugh, dean of the summer school, says: —

> Our experience in two years clearly suggests a few conclusions, which I may state as follows: —
>
> (1) There is a widespread and well-settled demand for the kind of work which we have to offer. This demand comes chiefly from teachers in the public schools.
>
> (2) This demand is strongest for technical courses, rather than for those dealing with theoretical or pedagogical subjects.
>
> (3) The most serious administrative problem connected with the summer school project is that of housing the pupils.
>
> (4) Some permanent form of organization should be established. One special object to be accomplished by such an organization is to offer a program of studies extending over three or four years, in order that pupils may return in successive years for the pursuit of a progressive course. Some further arrangement should be made also for co-operation between our summer school and the State normal schools.

Changes in the Faculty and Other Officers.

By vote of the trustees, Dr. Charles A. Goessmann was made honorary professor of chemistry, as well as honorary director of the experiment station.

Prof. C. H. Fernald entered upon his duties as director of the graduate school in September. Professor Fernald, perhaps more than any other man on the faculty, has endeavored to develop interest in graduate work at this college, and it is peculiarly appropriate that he should become the first director of the new graduate school.

By vote of the trustees, the division of agriculture has been organized, and Prof. James A. Foord, who had served during the previous college year as assistant professor of agronomy, was made acting head of the division of agriculture and professor of farm administration.

Prof. Wm. P. Brooks, who had served as professor of agriculture since 1889, will now give practically all his time to his work as director of the experiment station, but retains a college lectureship in soil fertility. Professor Brooks has been in charge of the college agriculture during a period when agriculture as a subject has been developing in an unprecedented way. His wide knowledge of the working field of agriculture has been at the disposal of the people of the State, and has been incorporated into widely read books. He still retains his connection with the teaching work in a field which has been his specialty.

On January 7 Dr. A. Armagnac, instructor in French, died suddenly in his class room. Dr. Armagnac had been appointed only the autumn previous, but had won the thorough respect of faculty and students, and the suddenness of his death was a shock to the whole college population. His work was carried for the balance of the semester by Dr. Henry C. Lancaster of Amherst College, and on February 10 Mr. John A. Munson assumed the duties of instructor in French and served for the balance of the college year.

The instructorship in French made vacant by the resignation of Mr. Munson, in June, was filled by the appointment of Mr. Anderson Mackimmie. Mr. Mackimmie is a graduate of Princeton University, where his scholarship attracted special attention. He taught for five years in the public schools of Nova Scotia and for two years in Colchester Academy, Truro, N. S. He has also had an experience of three years of constant travel in Europe.

In July Miss Ella Frances Hall resigned as librarian. Miss Hall had been connected with the library since August, 1899, assisting President Goodell for several years, and since President Goodell's death had had charge of the library. She always maintained a thorough interest in her work, and had kept in touch with library methods. The place thus made vacant was filled by the appointment of Mr. Charles R. Green. Mr. Green is a graduate of the Connecticut Agricultural College, was employed for four years on the Hartford "Courant," and since 1901 had been connected with the Connecticut State Library at Hartford. Mr. Green has entered upon his duties with energy, has already changed the library shelving to accommodate a larger number of books, and has plans for substantial enlargement of the library facilities.

Mr. Haskell returned in September from his leave of absence, which was largely spent abroad.

The changes in the staff of the experiment station during the year have been as follows: —

Mr. Walter E. Dickinson resigned Dec. 5, 1907, to accept a position in a sugar factory in Cuba, and the vacancy was filled by the appointment, on January 1, of Mr. J. C. Reed, a graduate of the University of Vermont.

Mr. E. T. Ladd resigned as assistant in plant and animal chemistry Dec. 20, 1907, to accept another position. His place was taken January 1 by Mr. L. S. Walker, an employee of the station, and Mr. Walker's place was filled Jan. 1, 1908, by Mr. P. V. Goldsmith, a graduate of the Michigan Agricultural College.

Oct. 1, 1908, Mr. Carl S. Pomeroy, who had been for a year and a half assistant in horticulture, resigned to accept a fine position with the United States Department of Agriculture, and the vacancy was filled October 1 by the appointment of Mr. J. K. Shaw. Mr. Shaw has the degree of Bachelor of Science in Agriculture from the University of Vermont, and of Master of Science from the Massachusetts Agricultural College. He had previously served as instructor in horticulture at the New Hampshire College, as acting assistant professor of horticulture at the University of Missouri, and as assistant in plant breeding at the New Jersey Experiment Station.

In the summer Miss Grace M. Knowles, secretary to the president of the college, resigned after two years of efficient service, and Mr. Ralph J. Watts, a graduate of the college in the class of 1907, was appointed to the position.

In August Miss Clara L. Stuart of Boston entered upon the duties of correspondence clerk in the president's office, serving also the dean and the registrar in the same capacity.

In June Mr. E. G. Bartlett resigned as assistant in botany, to accept a position in Hawaii, and Mr. H. M. Jennison of the class of 1908 was appointed to the place.

Mr. W. M. Thornton, assistant in chemistry, resigned in June, and his place was filled by the appointment of Mr. L. I. Shaw, a graduate from Alfred University, with the degree of Master of Science from Syracuse University. Mr. Shaw had also served as assistant in chemistry both at Alfred and at Syracuse.

In October Mr. A. D. Holmes, assistant in chemistry, resigned to assume graduate work in the Johns-Hopkins University. The vacancy has not yet been filled.

Appointments to New Positions in the Faculty.

The assistant professorship of physical education and hygiene was filled by the appointment of Dr. Percy L. Reynolds, a graduate from the physical director's course in the Springfield Training School. Dr. Reynolds has also received the degree of Doctor of Medicine from the University of Georgia, has had a seven years' experience as physical director in Young Men's Christian Association work, and for two years filled acceptably the directorship of physical training at the University of Maine.

In October Mr. Wm. P. B. Lockwood was elected assistant professor of dairying. Professor Lockwood graduated from the agricultural course of the Pennsylvania State College, has had two years' experience in handling high-class sanitary and modified milk with the Walker-Gordon Company, has spent three years in different branches of the condensed milk business, has taught in the short dairy and agricultural courses of the Pennsylvania State College, and has operated a condensed milk factory and creamery.

The position of instructor in agricultural education was filled by the appointment of Mr. Floyd B. Jenks, a graduate from the agricultural course at Purdue University. Mr. Jenks has had eight years' experience in teaching in elementary and secondary schools in both rural and city communities, as well as considerable experience in the management of farms.

The position of instructor in German was filled by the appointment of Mr. Edgar L. Ashley, who has the degree of both Bachelor of Arts and Master of Arts from Brown University. Mr. Ashley was instructor in German at Brown for three years, a student at the University of Heidelberg for one year, and instructor in German in charge of the department of German in Bates College, Maine, one year.

The position of instructor in agricultural economics has been filled by the appointment of Alexander E. Cance. Dr. Cance graduated from Macalester College in 1896, with the degree of Bachelor of Arts. He received the degree of Master of Arts from the University of Wisconsin in 1906 and the degree of Ph.D. from the University of Wisconsin in 1908. He has had considerable teaching experience, serving one year as teacher of high school Greek and history, one year as teacher of English in Gale College, Wisconsin, and one year as teacher of English and the sciences at Avalon College, Missouri. He was for three years principal of the Farm School at Asheville, N. C., and served one year as supervisor of practice at the First Pennsylvania State Normal School. Dr. Cance has specialized in economics and sociology, and is one of the few men of the country who have given particular attention to the economics of agriculture.

Graduate School.

A marked increase in the demand for thoroughly trained men has resulted in a corresponding increase in the number of graduate students at the college. That the graduate course could be improved by a more complete co-ordination and better organization has become evident, and accordingly the trustees established a graduate school at their meeting in June, and appointed Prof. C. H. Fernald director. Professor Fernald has been investigating the organization and requirements of similar schools in all parts of the country, by personal visits and correspondence, and a reorganization of the work here is now in progress. New subjects for graduate study will be added to those already offered, and the more complete separation of the graduate from the academic courses will certainly prove beneficial.

Loss of the New Barn.

Early in the morning of August 15 fire was discovered in the storage part of the new farm barn. At the time of discovery it was under full headway, and entirely beyond control. Two students of our senior class, Mr. Wayne E. Geer and Mr. Myron F. Geer, who had been employed in the stable during the summer, and who roomed in the barn, narrowly escaped with their lives.

A brief statement of the losses caused by the fire follows: —

Original cost of storage part,	$18,600 00
Cost to remove débris (contractor's estimate),	500 00
Damage to silos,	1,200 00
Temporary shed to house feed,	300 00
Cattle,	1,033 33
Hay and other feeds and fertilizers, etc.,	4,023 40
Equipment and sundry supplies,	2,959 28
Total,	$28,616 01

The Massachusetts District Police made an investigation as to the cause of the fire, but declared it to be unknown. Various theories as to its origin have been advanced, but no satisfactory explanation has been made.

Plans for a new structure will be submitted to you for your approval. I think that there is little doubt about the wisdom of housing implements and young stock in structures not connected with the barn for the storage of hay and grain.

Insurance.

It is the understanding of the trustees that the Commonwealth does not permit a State institution such as ours to carry insurance on its buildings or property. Without attempting to enter into an argument concerning the wisdom of this arrangement, I desire to call your attention to the fact that this law works injustice to the institution, unless there accompanies it some plan by which a sinking or insurance fund is established by the Commonwealth, out of which losses such as that caused by our fire may be adjusted under ordinary insurance rules. Occasional fires of this kind are inevitable. Under the present plan, however, when we ask an appropriation from the Legislature to make good the loss, we face two unpleasant facts: first, that we have to wait until the Legislature meets, and until they have given due deliberation to the request; second, that the appropriation requested practically takes its place as a new call upon the State treasury, instead of payment of insurance, which it really is. By reason of the first fact, we are delayed in properly restoring our equipment; because of the second fact, we are delayed in properly developing the institution. I recommend, therefore, that the trustees petition the Legislature either to remove the restriction with regard to our taking insurance, or to create a State insurance fund, which may become available, under proper regulations, for fire losses at this and other institutions.

PRINTING.

Under the act of the Legislature of 1908, the report of the trustees will hereafter be printed in four parts, as follows: —

Part I.	Report of the president and other officers of the institution.
Part II.	The catalogue of the college.
Part III.	A popular report of the experiment station.
Part IV.	A detailed or scientific report of the experiment station.

It is believed that this scheme of printing will not cost the State any more money than the old plan, and that it will give wider circulation to the report, as well as enable us to place these various reports in the hands of people most interested in the different parts of our work.

CAMPUS ENTERPRISES.

The real life of the institution centers in the student body. It is not possible in a report of this type to describe all of the activities which go to make up the world of the college campus.

I wish, however, to call attention to several features of this life that have recently been developed.

There is appended to this report a list of the speakers for the past fiscal year, who have appeared at the weekly assemblies on Wednesday (attendance of students at these assemblies being required) and at the Sunday vespers, a voluntary service held in co-operation with the Young Men's Christian Association of the college. (See Table III.)

The organization of a department of physical education, with a director in charge, opens a useful line of activity among the men of the college. I bespeak for this department your deep interest and full support. In a later report I hope to discuss at some length the problem of physical education and athletics in a college such as ours.

The library facilities continue inadequate, but some steps have been taken to give partial relief. In the reading room connected with the library there have been placed additional tables and chairs, additional electric lights, a long list of periodicals is at hand, and a special library of attractive books is available for the constant use of the students. In the library itself study tables have been provided and additional shelving has been placed in position. We cannot, however, deny the pressing need of a modern, fireproof building, fully adequate to the use of students.

The newest enterprise of the college campus which concerns the student body directly is the organization of the M. A. C. Social Union. Quarters in North College have been provided for the Union, which include a large assembly or lounging room, an office for the editors of the "College Signal," a committee room for the use of the officers of the various student organizations, and the present headquarters of the assistant professor of physical education and hygiene. The students themselves have purchased a piano and furniture; the college heats and lights the rooms and pays for janitor service. The college also assists in furnishing some of the entertainments provided by the Union. The whole purpose of the Union is to draw together the members of the student body, as well as to aid in bringing the entire population of the college into a larger fraternity.

Financial Aid for Students.

This college is still a "poor man's college." Many of the students "work their way" through without any outside aid whatever. Nevertheless, there are indications of a tendency toward a change. In the first place, the cost of living increases somewhat. Within two years we have been obliged to raise the price of board from $3.25 per week to $3.75, and at the last figure we are barely meeting the cost. We house less than 100 men on the campus, so that nearly two-thirds of the students must seek rooms in private houses. Apparently the cost of room rent is gradually going up. As the college grows and student enterprises increase, the cost to the individual student of supporting these enterprises has a tendency to advance. On the other hand, owing largely to the increase in students, there is a decreased opportunity for labor. The amount of labor about the institution available for students is of course limited. We do all we can to give work to competent men.

I do not wish to imply that conditions are as yet serious, but I fear that tendencies are at work which will make the cost to the average student more than he can afford; and it is possible also that the standard set by students not dependent on their own resources will more and more be the standard for the college. Before the situation becomes acute, I think we ought to consider the whole problem, so that we may avoid any tendency in our college life which shall make it more difficult for the student without means to complete his course here. I therefore recommend that the trustees designate a special committee, to be composed both of members of the trustees and members of the faculty, possibly to work in conjunction with representatives of the alumni and of the student body, to make a careful study of this question and to report to the trustees at some future time.

The Housing of Students.

One of the phases of the problem just referred to is the housing of students. There are rooms on the college campus for not to exceed 100 men. There are at present in the college

260 undergraduates, so that more than half of these live in private houses. Without entering at this present time into any discussion of the question of building dormitories, I wish to call your attention to the fact that circumstances make it necessary for the college to declare its policy on this subject. If the students are to be housed in private buildings, the owners of property in Amherst must in some way be encouraged to increase the number of houses available for such purpose. On the other hand, if the college is likely to adopt the policy of housing a large proportion of its students in dormitories, it is only fair to these people that they should be advised of the fact.

I recommend, therefore, that the trustees authorize the committee on buildings and grounds to make a special study of the whole problem of the housing of students, and report a definite recommendation at some future time.

Visiting Other Institutions.

Each institution must work out its own problem, in the light of its purpose, its history and its environment; nevertheless, each institution can learn from other institutions. Much of this information can be gathered from a study of catalogues and by correspondence; but especially in a college like ours, where the subjects of study are developing with great rapidity, where new methods must be constantly devised and new courses must be constantly added, it becomes extremely desirable that those most particularly charged with the administration of the institution shall be able to come into rather intimate touch with the work of similar institutions.

I desire to recommend that it become the settled policy of the trustees, therefore, to permit and encourage visitation of other colleges by members of the trustees and of the faculty, under such limitations and regulations as may seem wise.

The Development of the Grounds.

Four years ago the trustees passed a resolution organizing a commission on buildings and grounds, to be composed of the trustees' committee on new buildings and arrangement of grounds, with the addition of two members of the faculty. This commission was organized definitely two years ago, under the chairmanship of the late Mr. Draper. During this period it has had under consideration the general problem of the future development of the grounds, the location and architecture of the buildings, a system of sewage disposal and other questions connected with the general problem.

The commission has had the expert assistance of Mr. Frank Irving Cooper and the constant and specific advice of Prof. F. A. Waugh; and finally made arrangements with Mr. Warren H. Manning, the noted landscape designer of Boston, for the study of the entire problem. Mr. Manning has reported a general plan, which has been accepted by the commission, and as soon as further details are decided it is expected that the plan will be made public and thrown open for discussion.

Athletic Field.

Some fourteen years ago there was organized an association among the alumni of the college for the specific purpose of raising funds for the purchase of an enclosed athletic field for the use of the students of the college. A sum of money has been collected, but for various reasons the project has not come to a conclusion. During the past year a careful study of the problem has been made, and it now seems altogether advisable that the college shall own and control the athletic field. The Alumni Athletic Association will then be ready to turn its energies and funds into the proper equipment of the field for the use of the undergraduates. I think this arrangement is a most happy one.

I wish to call your attention to the fact, however, that on land at present owned by the college there is no place fully adequate to the demands of an athletic field. I trust that the need for this field and the need of land on which to place it may be vigorously set before the incoming Legislature, in order that we may bring this whole matter to an early conclusion. It is extremely desirable from every point of view that this field should become a permanent feature of our department of physical education.

Further Needs of the College.

1. *Building for the Departments of Zoölogy and Entomology.*

A year ago I called your attention to the need for better housing for these departments. This need for room is becoming pressing, nearly twice as many men electing entomology as the laboratory will accommodate. From the standpoint of protecting valuable property, a new building is, I think, imperative. In accordance with your vote, the committee on buildings has had plans prepared for a structure that will house both departments in an adequate fashion. In the judgment of the committee, this building should be of fireproof construction throughout. I am sure, also, that it is the judgment of the committee that it should be the accepted policy of the college to plan in the future for fireproof buildings only, — except of course for certain minor structures, such as small barns, etc. I trust that the Legislature of 1909 may be persuaded to grant our full request, in order that we may build in worthy fashion for these important departments.

2. *Buildings for the Division of Agriculture.*

I have already referred to the desirability of housing young stock in a structure separate from the storage barn; I have the same recommendation in regard to tools and machinery. If the Legislature reimburses the college for the fire loss, the money thus available may possibly enable us to build these two structures in addition to the storage barn; but if it does not, I think we should ask for a special appropriation to complete these two structures during the coming summer.

One of the neglected fields in our agricultural work has been instruction in poultry keeping. I am informed that the State of Massachusetts consumes about $25,000,000 worth of poultry products annually, and produces only about $5,000,000 worth. It is perfectly obvious that this industry may be made one of the large factors in Massachusetts agriculture, but it needs the leadership of the college, in instruction at the institution and other extension work. I strongly recommend, therefore, asking the Legislature for a sufficient amount of money to establish a department of poultry husbandry, including an item of perhaps $5,000 for a set of buildings adapted to instruction in poultry keeping, both to the college students and to short-course students.

I think it is also important that we should begin instruction in what we may call for the present farm mechanics, but which ought to develop finally into a department of agricultural engineering, covering all of the construction and engineering work that come up in the management of a farm or in the development of rural communities. I recommend that we endeavor to establish farm mechanics work during the next college year, and that we ask the Legislature for funds both for instruction and for a small outfit of tools and machines, in order that a beginning may be made.

The live stock interests of Massachusetts are hardly comparable with those of the great western States, in which the agricultural colleges have made a large feature of animal husbandry; nevertheless, it would be fatal to neglect securing a strong department of animal husbandry in this college. Furthermore, the dairy interest is bound to play a permanent and large part in Massachusetts agriculture. Whether we consider the matter from the dairyman's point of view, or as a phase of animal husbandry teaching, we need to give good instruction in stock judging. At present we have no place where this can be done. A small stock-judging pavilion is therefore necessary, and I recommend that an item for such a building be placed in our legislative budget.

I have before called your attention to the need of a very large development, in the immediate future, of our division of agriculture. I do not wish to be critical, but it is a simple statement of fact to say that, so far as the equipment, buildings, laboratories and apparatus for teaching modern technical agriculture are concerned, this college at present not only fails to rank with the stronger agricultural colleges, but, aside from the new stable, we can hardly make a good comparison with the smaller of our agricultural colleges. We cannot hope to impress upon our students the importance of agriculture, when we have so meager facilities for teaching it. I think the college has been quite wise in its selection of new structures during the buildings era which began seven or eight years ago, but the time has arrived when we can no longer ignore agriculture.

I therefore recommend with great emphasis that the committee on farm and horticulture, acting of course with Professor Foord and with the committee on buildings, be requested to have plans prepared during the year for a suitable dairy building. This building should be large enough to provide for this important work for several years to come, and should be adapted to instruction both in butter dairying and in milk dairying, and adapted, also, to instruction for both college students and short-course students.

I recommend also that the committee on buildings be requested, acting also with Professor Foord, to have plans prepared for an instruction building designed to house the division of agriculture. I think the suggestion that has been made informally by Mr. Bowker, that such a building should be called "Stockbridge Hall," is entirely appropriate; and I believe that we should ask for a building worthy of the agriculture of Massachusetts and worthy the man whose name it may bear. Personally, I believe that we should plan for a building to cost not less than $150,000. It should contain offices, laboratories and class rooms sufficient for a division very much larger than at present exists. If it seems unwise to ask for so large a sum at once, I think we should still make our plans comprehensive, but of such a character that perhaps half the building could be constructed under a single appropriation, the other half to be added when the needs of the division make it imperative.

3. *Miscellaneous Building and Repair Needs.*

I again recommend that we ask the Legislature for a fruit storage house for the department of pomology.

I also wish to emphasize the pressing need of a new dynamo. The last Legislature refused to make an appropriation for this purpose. The old dynamo has practically given out, and we are paying in the neighborhood of $250 a month for electric lights, whereas with our own dynamo the cost per month would be trivial. It is a very short-sighted business policy that compels us to continue this plan.

The addition of Clark Hall and the new glass houses, with the new teaching building connected therewith, will tax the capacity of the heating plant. As other structures are likely to be added to the group of buildings on the east side of the campus, and particularly if we are to have the new building for entomology, the question of proper extension of the heating plant becomes of prime importance; steps should be taken to carry out such an extension.

I think that all the departments have been feeling the handicap of meager equipment, and, while it is possible that the present requests from these departments aggregate a rather large sum, I do not think that they represent an extravagant policy.

North College still needs further attention. The work done this last season has revolutionized the interior aspect of the building. The students thoroughly appreciate the opportunities offered by the new Social Union, and I think we ought to utilize the entire basement in such a way as to provide further facilities in the development of a social center.

Practically all of the frame buildings on the campus very much need repainting, and some of the brick buildings need trimming. I recommend that we ask the Legislature for a sum sufficient to do this, and that, if this sum is granted, we ask a competent architect to outline a scheme of colors for the various buildings, which shall, if possible, give a more pleasing effect than prevails at the present time.

The trustees recognize, of course, that the newly organized department of physical education has absolutely no equipment for its work. I therefore recommend that the interior of the drill hall be refitted as a gymnasium in such a way as not to interfere with its use as a drill hall, and that the department of physical education be given a reasonable equipment of gymnasium apparatus.

4. Increase of Amount of Annual Income.

I am quite aware that the last Legislature made a fairly substantial increase in the amount of funds coming to us from the Commonwealth each year. I have no thought that we are to need large annual increases perpetually, although of course the needs of the college are bound to expand; but we must remember that for a number of years the college failed to expand in the matter of new departments, particularly at a time when the leading agricultural colleges were growing at an extremely rapid rate. I think it is perfectly clear, therefore, that we need, as it were, to "catch up," so I have no hesitation in recommending that we ask the incoming Legislature for a very substantial addition to our annual income.

In the matter of new instruction, for instance, I think we should have a professor of forestry. I suppose that I have had more letters from prospective students asking about forestry instruction here than on any other subject. Quite a large percentage of the present freshman class, in declaring their proposed vocation, named forestry. The Commonwealth is taking active steps to solve the forestry problem. We cannot afford to linger behind on the educational side.

I have already referred to the need for departments of poultry husbandry and farm mechanics; I would also suggest the desirability of securing a man to develop a department of rural sociology. I have for many years been convinced that a college of agriculture ought to emphasize the economic and social aspects of agriculture fully as much as the production and scientific aspects. My recent trip with the Commission on Country Life gave me a new emphasis upon this side of our work. I strongly urge that we try to secure such a man.

The head of the division of the humanities desires to develop much more completely than it has ever been possible to do heretofore the work of public speaking, and I endorse cordially his recommendation that he be given opportunity to employ a man who will become instructor in public speaking. Our students need this work and desire it, and it is too important to be overlooked.

With the growth of the freshman class, the large increases in our senior classes and the development of new departments, there are several assistants needed in the teaching and clerical work. I estimate that we need for the college year of 1909–10 at least $13,000 more than we are now receiving for instruction purposes.

We have organized a graduate school, and I recommend that we ask the Legislature for not less than $5,000 a year for the purpose of carrying on this most important work.

The college budget will show that, although our apportionment to departments is considerably larger than last year, we shall be enabled to carry that increase safely for the present fiscal year. At the beginning of another fiscal year, however, unless we have a substantial increase in our maintenance item, we shall face a serious deficit. The department of general maintenance, supervised by the treasurer of the college, asks this year for $17,300 net. Our coal bill alone is nearly $9,500. The $15,000 arising from scholarships must go into equipment and maintenance of the academic departments of the college. I think, therefore, that we ought to ask the Legislature to increase the maintenance item from $7,000 to $20,000 a year.

We should begin the work of making an agricultural survey of Massachusetts. The departments of floriculture and market gardening are prepared to make a survey of the greenhouse industry. The department of pomology is ready to undertake an orchard survey of the State, and the department of farm administration desires to investigate farm management in Massachusetts. This work is just as vital to the development of adequate teaching as the research work of our experiment station, and I strongly recommend that steps be taken to secure a small fund for this purpose.

I also believe that we should gradually extend the scope of our short-course work. I wish that another autumn we might undertake, in a small and experimental way, several projects looking toward leadership of the college among the working farmers of the State. I think we ought to enlarge our short-course work at the college; and, still further, that we should heed the constant calls coming to us from farmers, from clergymen, from teachers and from students in the Young Men's Christian Association schools for correspondence courses; that we should more completely organize the work of our teachers who are asked to lecture away from the college; that we should prepare leaflets on agricultural subjects, particularly for young people who are looking to us for agricultural instruction; that we should organize a series of educational exhibits at the agricultural fairs of the State; that we should renew the efforts for better-farming railway trains and for trolley car exhibits; that we should experiment with travelling schools in horticulture and poultry keeping; and that we should at once begin to organize the co-operative demonstration work in different parts of the Commonwealth.

There are other minor recommendations for improvement and equipment, but I have perhaps even now gone too fully into details. I do plead, however, most urgently for a legislative appropriation which will enable us to develop the college in the immediate future to something like its normal equipment.

Obituary.

It becomes my duty to chronicle the death of Mr. W. W. Rawson, who passed away Aug. 9, 1908. Mr. Rawson was appointed to the Board of Trustees by Governor Guild in January of this year. His term of service was thus very brief, but his success in his own business of gardening, his political acquaintance and accomplishments, his leadership among the gardeners and florists of the State, his vigor of mind and practical business instinct and his sterling integrity, would have been, had he lived, splendid assets for the college.

Respectfully submitted,

KENYON L. BUTTERFIELD.

Amherst, Mass., Nov. 30, 1908.

STATISTICS OF THE COLLEGE.

TABLE I. — *Attendance.*

	For Year ending June 30, 1908.		For Year ending Nov. 30, 1908.	
Graduate students,		7		12
Senior class,	58		49	
Junior class,	54		48	
Sophomore class,	47		52	
Freshman class,	87		114	
		246		263
Short courses: —				
Winter course, 1908,	32		32	
Bee course, 1908,	3[1]		3	
Summer school,	210[2]		168[3]	
		245		203
Total,		498		478

[1] Not in regular course. [2] 1907. [3] 1908.

TABLE II. — *Legislative Budget, 1908.*

	Asked.	Granted.
I. Deficiency Appropriations.		
1. Deficit in current funds,	$13,000 00	
2. Deficit in cost of barn,	3,690 10	
Total,	$16,690 10	$23,617 04[1]
II. Increase in Current Annual Appropriation.		
3. Increase in maintenance, to cover regular apportionment,	$2,000 00	$2,000 00
4. Increase in instruction appropriation,	13,000 00	13,000 00
5. Increase in current annual appropriation, to cover cost of short courses and correspondence courses,	8,000 00	5,000 00
Total,	$23,000 00	$20,000 00[2]
III. Special Apportionment.		
6. Target range and equipment,	$1,000 00	$1,000 00
7. Repairing and refitting experiment station buildings,	4,000 00	4,000 00
8. Addition to electric light plant,	6,000 00	–
9. Repairing and refitting North College,	6,000 00	6,000 00
10. Enlargement and improvement of library facilities,	2,500 00	1,000 00
11. Department equipment,	8,000 00	4,000 00
12. Miscellaneous repairs and minor improvements,	7,700 00	5,000 00
13. Fruit storage house,	2,500 00	–
14. Glass houses, attached teaching building and equipment for same,	34,000 00	34,000 00
Total,	$71,700 00	$55,000 00
Grand total,	111,390 10	98,617 04[3]

[1] Provided also for deficit in dining hall, $3,187.77; and in Burnham fund, $3,000.

[2] For 1908, $13,000.

[3] For 1908, $91,617.04.

TABLE III. — *Speakers for the Year.*

Speakers at Assemblies for Year ending Nov. 30, 1908.

1907.
Dec. 4. — Mr. William E. Spencer, Amherst.
1908.
Feb. 12. — Rev. Calvin Stebbins, Framingham.
Feb. 19. — Mr. J. H. Hale, South Glastonbury, Conn.
Mar. 11. — Mr. E. C. Mercer, New York, N. Y.
Mar. 18. — Mr. Edwin D. Mead, Boston.
May 6. — Dr. Howard Edwards, Kingston, R. I.
May 13. — Rev. Ora Samuel Gray, Amherst.
Sept. 30. — Mr. Henry Bond, Greenfield.
Oct. 7. — Mr. Horatio Knox, Providence, R. I.
Oct. 21. — President George E. Fellows, Orono, Me.
Nov. 4. — Director Rufus W. Stimson, Northampton.
Nov. 11. — Dr. George W. Tupper, Boston.

Speakers at Vesper Services for Year ending Nov. 30, 1908.

1907.
Dec. 8. — Rev. Ozora S. Davis, New Britain, Conn.
Dec. 15. — Rev. J. Ross Stevenson, Fifth Avenue Church, New York, N. Y.
1908.
Jan. 5. — Rev. A. P. Reccord, Springfield.
Jan. 12. — Prof. H. A. Bridgeman, "Congregationalist."
Jan. 19. — Rev. Arthur A. Coar, Springfield.
Jan. 26. — Rev. Willis H. Butler, Northampton.
Mar. 1. — Rev. J. G. Nichols, South Hadley.
Mar. 8. — Rev. Samuel Eliot, Boston.
Mar. 15. — Rev. F. L. Goodspeed, Springfield.
Mar. 22. — Mr. F. L. Willis, Worcester.
Sept. 27. — Rev. Philip S. Moxom, Springfield.
Oct. 4. — Rev. Ora Samuel Gray, Amherst.
Oct. 11. — Rev. John C. Breaker, Northampton.
Oct. 18. — Mr. F. L. Willis, Worcester.
Oct. 25. — Rev. Edward F. Sanderson, Providence, R. I.
Nov. 1. — Dr. Lyman Abbott, New York, N. Y.
Nov. 8. — Dr. W. W. Fenn, Cambridge.
Nov. 15. — Dr. William E. Barton, Chicago, Ill.
Nov. 22. — Rev. C. L. White, New York, N. Y.

TABLE IV. — *Students entering College in the Autumn of 1908.*

Occupations of Fathers.

OCCUPATIONS.	Number.	Per Cent.
Agriculture and horticulture,	23	19.00
Professional,	9	8.00
Business,	27	22.50
Artisans,	17	14.16
Miscellaneous,	32	26.00
Deceased,	12	10.00

Intended Vocations.

VOCATIONS.	Number.	Per Cent.
Agriculture and horticulture (practical),	28	23.33
Agriculture (scientific),	56	46.67
Teaching,	1	.83
Engineering,	18	15.00
Miscellaneous,	2	1.67
Undecided,	15	12.50

Religious Census.

DENOMINATION.	MEMBERSHIP.		PREFERENCE.		TOTAL.	
	Number.	Per Cent.	Number.	Per Cent.	Number.	Per Cent.
Baptist,	2	1.67	6	5.00	8	6.67
Catholic,	21	17.50	–	–	21	17.50
Congregational,	23	19.17	21	17.50	44	36.67
Episcopal,	4	3.33	4	3.33	8	6.67
Methodist,	6	5.00	4	3.33	10	8.33
Unitarian,	3	2.50	6	5.00	9	7.50
Universalist,	3	2.50	3	2.50	6	5.00
Miscellaneous,	2	1.67	12	10.00	14	11.67
Total,	64	53.34	56	46.66	120	100.01

Miscellaneous Statistics.

Average age (freshmen only),	19 years.
Number applying for student labor,	69; 57.5 per cent.
Number boarding at Draper Hall,	97; 80.8 per cent.

Home Addresses.

Abington,	1	Canton,	1
Alandar,	1	Chelsea,	1
Amherst,	14	China,	1
Arlington,	1	Clifford,	1
Ashburnham,	1	Concord,	1
Attleborough,	1	Cumberland,	1
Bernardston,	1	Chester,	1
Billerica,	1	Danvers,	1
Boston,	7	Dorchester,	2
Brockton,	2	Easthampton,	1
Brooklyn, N. Y.,	1	East Wareham,	1
Buckland,	1	Elkhart, Ind.,	1
Buffalo, N. Y.,	1	Fall River,	2
Cambridge,	1	Greenwich Village,	1

TABLE IV. — *Students entering College in the Autumn of 1908* — Concluded.

Home Addresses — Concluded.

Hingham,	1	Pittsfield,	1
Holden,	1	Revere,	1
Holyoke,	2	Ringville,	1
Hopedale,	1	Roxbury,	2
Jamaica Plain,	2	Seattle, Wash.,	1
Leicester,	1	Shelburne Falls,	1
Leominster,	1	Somerville,	1
Littlefalls, N. Y.,	1	South Hadley Falls,	1
Lowell,	1	South Lincoln,	1
Lynn,	1	Stow,	1
Marlborough,	4	Sturbridge,	1
Melrose Highlands,	1	Sunderland,	1
Medfield,	1	Turners Falls,	3
Medford,	2	Taunton,	2
Natick,	2	Wakefield,	1
New Haven, Conn.,	1	Waterbury, Conn.,	1
Newton,	1	Watertown,	1
New York, N. Y.,	2	Wayland,	1
North Abington,	1	Weathersfield, Conn.,	1
North Adams,	1	Wenham,	1
North Leverett,	1	West Barnstable,	1
North Reading,	1	Westhampton,	1
North Wilmington,	1	Williamsburg,	1
Orange,	1	Winchester,	2
Osterville,	1	Worcester,	6
Otego, N. Y.,	1		

GIFTS, 1908.

The most notable gift of the year was the legacy of Mrs. Louisa M. Baker, a long-time friend of the college, who left the sum of $6,000 to be held in trust by the college, the income to be used for the aid of needy students. It is needless to say that so long as a large proportion of our students are dependent to a greater or less degree upon their own resources, this gift can be used to good advantage. Other gifts are: —

Dr. George W. Rawson, Amherst: seventeen volumes of medical books and a collection of histological specimens, to the veterinary department.

American Coal Products Company, 17 Battery Place, New York, N. Y.: five hundred pounds ammonium sulfate.

The Boston Poultry Dry Feed Hopper Company, 62 Causeway Street, Boston: two dry feed hoppers.

Bowker Fertilizer Company, 43 Chatham Street, Boston: one-half ton high-grade Stockbridge fertilizer.

Mr. Edward F. Cameron, Helena, Mont.: one Lightning Dandelion Exterminator.

Cyphers Incubator Company, Buffalo, N. Y.: four thermometers for incubators; four brooder thermometers.

The Albert Dickinson Company, Chicago, Ill.: samples of grass seeds.

Earp-Thomas Farmogerm Company, 233 Washington Street, Bloomfield, N. J.: cultures for peas, beans and sweet peas; samples Farmogerm for peas, beans, sweet peas and alfalfa.

German Kali Works, 93 Nassau Street, New York, N. Y.: one ton kainit; one ton muriate of potash; two tons sulfate of potash; one ton sulfate of potash magnesia.

James J. H. Gregory & Son, Marblehead: four pounds Eldorado potatoes; four pounds Early King potatoes; four pounds Big Copper potatoes.

J. W. Guerney, Cummington: one peck Beauty of Hebron potatoes for seed.

E. L. Hahn & Co., Muscatine, Ia.: fertilizer distributer.

Peter Henderson & Co., 35 and 37 Cortlandt Street, New York, N. Y.: twenty-one samples of grass for trial grounds.

THE NEW ENGLAND GAS AND COKE COMPANY, Shawmut Bank building, Boston: one thousand pounds sulfate of ammonia.

HENRY NUNGESSER & Co., 63 and 65 Pearl Street, New York, N. Y.: samples of grass for grass garden.

Dr. DAVID ROBERTS VETERINARY COMPANY, Waukesha, Wis.: book, "Abortion in Cows."

ROCKLAND-ROCKPORT LIME COMPANY, Rockland, Me.: one barrel "Pine Cone" hydrate of lime.

THE MASSACHUSETTS SOCIETY FOR PROMOTING AGRICULTURE: prizes for short courses: For best work during the course, three prizes, — $50, $30 and $20. For best butter made by students, three prizes, — $25, $15 and $10. For excellence in stock judging, four prizes, — $10, $7.50, $5 and $2.50.

THE BOWKER FERTILIZER COMPANY, Boston: one-half ton Stockbridge fertilizer as prize in short courses.

B. VON HERFF, German Kali Works, New York, N. Y.: one ton kainit as prize in short courses.

LOANS, 1908.

VERMONT FARM MACHINE COMPANY, Bellows Falls, Vt.: one No. 4 Separator; one No. 6 Separator.

D. H. BURRELL & Co., Little Falls, N. Y.: one No. 2 Simplex Separator.

DE LAVAL SEPARATOR COMPANY, New York, N. Y.: one Acme Turbine Separator; one Baby No. 3 Separator; one No. 12 Separator.

SHARPLES SEPARATOR COMPANY, West Chester, Pa.: one No. 4 Tubular Hand Separator; one No. 10 Tubular Steam Separator.

EMPIRE CREAM SEPARATOR COMPANY, Bloomfield, N. J.: one Empire No. 1 Separator.

STODDARD MANUFACTURING COMPANY, Rutland, Vt.: one 24-bottle Wizard Turbine Tester.

IOWA SEPARATOR COMPANY, Waterloo, Ia.: one No. 3 Separator.

INTERNATIONAL HARVESTER COMPANY, Chicago, Ill.: one No. 3 Separator.

SEARS, ROEBUCK & Co., Chicago, Ill.: one No. 6 "Economy" Separator.

REPORT OF THE TREASURER

FOR THE FISCAL YEAR ENDING NOV. 30, 1908.

BALANCE SHEET.

			Dr.	Cr.
1907.				
Dec. 1.	To cash on hand,		$558 00	–
	By First National Bank (overdraft),		–	$7,858 00
1908.				
Nov. 30.	To special appropriation receipts, State Treasurer,		76,843 71	–
	By special appropriation disbursements,		–	80,794 59
	To experiment station receipts,		52,211 23	–
	From State Treasurer,	$10,500 00		
	From U. S. Treasurer,	25,000 00		
	From other sources,	16,711 23		
	By experiment station disbursements,		–	52,650 37
	To current accounts receipts,		141,641 98	–
	From U. S. Treasurer, Morrill fund,	$16,666 67		
	From U. S. Treasurer, Nelson Fund,	6,666 66		
	From State Treasurer, endowment fund,	10,613 32		
	From State Treasurer, maintenance,	11,500 00		
	From State Treasurer, scholarship,	15,000 00		
	From State Treasurer, instruction,	21,500 00		
	From State Treasurer, short courses,	3,750 00		
	From State Treasurer, Burnham emergency,	3,000 00		
	From State Treasurer, deficit,	13,739 17		
	From State Treasurer, veterinary,	1,000 00		
	From State Treasurer, heat and light,	500 00		
	From other sources,	37,706 16		
	By current accounts disbursements,		–	131,088 63
	To student trust funds receipts,		37,996 67	–
	By student trust funds disbursements,		–	38,829 42
	By cash on hand,		–	1,817 75
	To First National Bank (overdraft),		3,787 17	–
			$313,038 76	$313,038 76

	Balance Sheet, Dec. 1, 1907.		Transactions, Dec. 1, 1907, to Nov. 30, 1908.		Balance Sheet, Nov. 30, 1908.	
	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.
Cash on hand,	$558 00	–	–	$1,259 75	$1,817 75	–
Cash on deposit (overdraft),	–	$7,858 00	–	4,070 83	–	$3,787 17
Experiment station,	–	5,719 94	$52,211 23	52,650 37	–	5,280 80
Special appropriation,	15,009 42	–	76,843 71	80,794 59	18,960 30	–
Trust funds,	818 22	–	37,996 67	38,829 42	1,650 97	–
Current accounts,	–	2,807 70	141,641 98	131,088 63	–	13,361 05
Totals,	$16,385 64	$16,385 64	$308,693 59	$308,693 59	$22,429 02	$22,429 02

Statement of the First National Bank with the Massachusetts Agricultural College.

		Dr.	Cr.
1907. Dec. 1.	Balance on hand,	$2,513 44[1]	–
1908. Nov. 30.	Deposits,	302,376 92	–
	Interest,	285 54	–
	Disbursements as per warrants paid,	–	$293,984 31
	Balance on hand,	–	11,191 59[1]
		$305,175 90	$305,175 90

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[1] These amounts are greater Dec. 1, 1907, by $10,371.44, and Nov. 30, 1908, by $14,978.76, on account of outstanding drafts.

Statement of Special Appropriation Accounts.

Name of Appropriation.	Date.	Total Appropriation.	Amount expended to Date.	Balance unexpended Nov. 30, 1908.
Horticultural building,	1905	$39,950 00	$39,950 00	–
Clark Hall,	1906	45,000 00	45,000 00	–
Chemical appropriation,	1906	1,000 00	1,000 00	–
Clark Hall equipment,	1907	24,400 00	24,400 00	–
Dairy equipment,	1907	3,000 00	3,000 00	–
Live stock,	1907	4,000 00	4,000 00	–
Omnibus,	1907	14,000 00	14,000 00	–
New boiler,	1907	2,000 00	2,000 00	–
Barn deficit,	1908	3,690 10	3,690 10	–
Target range,	1908	1,000 00	993 53	$6 47
Experiment station,	1908	4,000 00	3,281 48	718 52
Glass houses and instruction building,	1908	34,000 00	18,184 97	15,815 03
North dormitory,	1908	6,000 00	5,999 89	11
Library,	1908	1,000 00	347 23	652 77
Teaching equipment,	1908	4,000 00	1,837 54	2,162 46
Repairs,	1908	5,000 00	3,879 20	1,120 80
Totals,		$192,040 10	$171,563 94	$20,476 16

Current Accounts.

Disbursements and Receipts.

Accounts.	Disbursements from Dec. 1, 1907, to Nov. 30, 1908.	Receipts from Dec. 1, 1907, to Nov. 30, 1908.	Apportionment for Year ending Nov. 30, 1908.	Balance to Credit.
Agricultural,	$22,812 34	$15,024 07	$6,376 00	—$1,412 27
Botanical,	1,156 75	678 60	500 00	21 85
Burnham emergency income,	–	50 00	–	50 00
Chemical,	2,773 60	795 04	2,272 81	294 25
Cleaning,	677 05	–	–	—677 05
Contingent,	1,437 45	150 16	1,000 00	—287 29
Dean's office,	95 34	–	25 00	—70 34
Entomological,	806 90	180 15	579 86	—46 89
English,	98 71	–	50 00	—48 71

CURRENT ACCOUNTS — *Concluded.*

Disbursements and Receipts — Concluded.

ACCOUNTS.	Disbursements from Dec. 1, 1907, to Nov. 30, 1908.	Receipts from Dec. 1, 1907, to Nov. 30, 1908.	Apportionment for Year ending Nov. 30, 1908.	Balance to Credit.
Heat, light and water,	$16,823 31	$1,067 86	$13,000 00	—$2,755 45
Horticultural,	11,579 85	5,963 14	5,100 00	—516 71
Library,	2,411 64	634 38	1,725 00	—52 26
Meteorology,	248 05	–	350 00	101 95
Miscellaneous,	9,921 54	8,473 79	–	—1,447 75
Mathematics,	194 74	–	255 00	60 26
Military,	382 89	25 00	355 00	—2 89
Normal department,	6,061 08	773 09	3,750 00	—1,537 99
President's office,	3,294 65	28 01	7,000 00	3,733 36
Rents,	85 55	4,658 74	–	4,573 19
Registrar,	97 40	–	75 00	—22 40
Students' fees,	–	18 00	–	18 00
Salaries,	50,380 19	208 33	50,171 86	–
Treasurer's office,	611 81	44 07	600 00	32 26
Veterinary,	1,747 30	1,015 02	919 25	186 97
Zoölogical,	382 79	191 80	120 00	—70 99
Graduate school,	68 78	–	250 00	181 22
State Treasurer: —				
Endowment fund,	–	10,613 32	–	–
Instruction fund,	–	21,500 00	–	–
Maintenance fund,	–	11,500 00	–	–
Scholarship fund,	–	15,000 00	–	–
Short courses,	–	3,750 00	–	–
Normal courses,	–	3,750 00	–	–
Deficit appropriation,	–	13,739 17	–	–
United States Treasurer: —				
Morrill fund,	–	16,666 67	–	–
Nelson fund,	–	6,666 66	–	–
Totals,	$134,149 71[1]	$143,165 07[1]	$94,474 78	$304 32
Balance, beginning of fiscal year, Dec. 1, 1907,	–	2,807 70	–	–
Balance on hand, Nov. 30, 1908,	11,823 06	–	–	–
	$145,972 77	$145,972 77	–	–

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[1] These amounts are greater than the figures used in the statement by $3,061.08 for the disbursements and $1,523.09 for receipts, on account of including the normal and short course funds and leaving out the Burnham emergency account which aggregate the above.

Summary.

	Disbursements.	Receipts.
By cash on hand,	–	$2,807 70
By institution receipts,	–	39,929 25
By State Treasurer receipts,	–	66,113 32
By United States Treasurer receipts,	–	21,388 86
By accounts receivable, State Treasurer,	–	4,500 00
By total disbursements,	$134,149 71	–
	$134,149 71	$134,739 13
Bills receivable Dec. 1, 1907, deducted,	–	2,142 40
Bills payable Dec. 1, 1907, deducted,	3,066 09	–
	$131,083 62	$132,596 73
Bills receivable Nov. 30, 1908,	–	5,144 80
Extraordinary expense on account of barn fire,	–	2,347 14
Bills payable Nov. 30, 1908,	3,600 35	–
Balance,	5,404 70	–
	$140,088 67	$140,088 67

EXPERIMENT STATION.

Disbursements and Receipts.

ACCOUNTS.	Disbursements from Dec. 1, 1907, to Nov. 30, 1908.	Receipts from Dec. 1, 1907, to Nov. 30, 1908.	Apportionment for Year ending Nov. 30, 1908.	Balance to Credit.
Administration,	$1,738 14	$88 48	$2,150 00	$500 34
Agricultural,	5,193 83	3,235 96	2,480 00	522 13
Asparagus,	1,879 33	–	1,100 00	—779 33
Botanical,	1,433 88	54 59	1,400 00	20 71
Chemical,	7,913 34	4,844 57	3,400 00	331 23
Cranberry,	214 06	–	900 00	685 94
Entomology,	619 57	2 00	800 00	182 43
Fertilizer,	–	5,390 00	–	5,390 00
Freight,	438 71	85	250 00	—187 86
Feed law,	2,813 11	3,003 78	–	190 67
Graves orchard,	189 37	–	500 00	310 63
Horticultural,	925 12	10 00	1,500 00	584 88
Library,	159 57	–	300 00	140 43
Meteorology,	79 63	–	200 00	120 37
Publications,	2,885 45	–	3,700 00	814 55
Salaries,	25,631 32	75 00	25,745 00	188 68
Treasurer's office,	340 80	–	400 00	59 20
Veterinary,	195 14	6 00	400 00	210 86
Hatch fund,	–	15,000 00	–	–
Adams fund,	–	10,000 00	–	–
State fund,	–	10,500 00	–	–
Totals,	$52,650 37	$52,211 23	$45,225 00	$9,285 86
Balance, beginning of fiscal year, Dec. 1, 1907,	–	5,719 94	–	–
Balance on hand Nov. 30, 1908,	5,280 80	–	–	–
	$57,931 17	$57,931 17	–	–

AGRICULTURAL DIVISION.

Disbursements and Receipts for Fiscal Year ending Nov. 30, 1908.

	Disbursements.	Receipts.
Academic.		
Maintenance,	$266 06	$0 16
Equipment,	11 80	–
Student labor,	118 29	–
Miscellaneous,	16 21	46 72
Winter school,	3,167 99	1,866 60
Totals,	$3,580 35	$1,913 48
Farm.		
Labor,	$9,010 76	$2,624 17
Dairy barn,	2,974 12	6,449 61
Field crops,	1,305 22	2,726 24
Horses,	1,396 19	606 09
Swine,	150 45	424 01
Tools and implements,	182 68	1 50
Office,	165 91	1 47
Sundry,	377 02	155 00
Student labor,	1,200 00	–
Fire,	2,469 64	122 50
Totals,	$19,231 99	$13,110 59
Division totals,	22,812 34	15,024 07

AGRICULTURAL DIVISION — *Concluded.*

Summary.

	Dr.	Cr.
By total division receipts,	–	$15,024 07
By bills receivable,	–	1,513 25
By fire account expenses,	–	2,347 14
By apportionment,	–	6,376 00
To total disbursements,	$22,812 44	–
To bills payable,	53 15	–
To balance unexpended,	2,394 87[1]	–
	$25,260 46	$25,260 46

Inventory of Quick Assets.

	Dec. 1, 1907.	Nov. 30, 1908.
Inventory of produce,	$6,851 50	$2,381 00
Inventory of cattle,	5,000 00	5,700 49
Inventory of swine,	901 00	206 41
Inventory of horses,	6,500 00	7,005 00
	$19,252 50	$15,292 90

[1] This balance includes $2,347.14 due on account of fire.

HORTICULTURAL DIVISION.

Disbursements and Receipts for Fiscal Year ending Nov. 30, 1908.

	Disbursements.	Receipts.
Market gardening,	$3,668 47	$1,748 74
General horticulture,	3,366 97	1,002 36
Floriculture,	2,909 44	1,987 53
Pomology,	1,507 93	1,061 21
Landscape gardening,	127 04	163 30
Totals,	$11,579 85	$5,963 14

Summary.

	Dr.	Cr.
By total division receipts,	–	$5,963 14
By bills receivable,	–	1,048 60
By apportionment,	–	5,100 00
To total division disbursements,	$11,579 85	–
To total division bills payable,	114 09	–
To balance unexpended,	417 80	–
	$12,111 74	$12,111 74

Inventory of Quick Assets.

	Dec. 1, 1907.	Nov. 30, 1908.
Inventory of produce,	$295 00	$100 00

INVENTORY — REAL ESTATE.

Land (Estimated Value).

College farm,	$37,000 00	
Pelham quarry,	500 00	
Bangs place,	2,350 00	
Clark place,	4,500 00	
		$44,350 00

College Buildings (Estimated Value).

Drill hall,	$5,150 00	
Powder house,	75 00	
Gun shed,	1,500 00	
Stone chapel,	30,225 00	
South dormitory,	35,500 00	
North dormitory,	25,400 00	
Chemical laboratory,	8,200 00	
Entomological laboratory,	5,000 00	
Veterinary laboratory and stable,	23,125 00	
Farmhouse,	2,050 00	
Horse barn,	5,020 00	
Barn and silo,	21,200 00	
Graves house and barn,	1,560 00	
Dining hall,	35,450 00	
Mathematical building,	5,600 00	
Wilder Hall,	37,300 00	
Tool house,	2,000 00	
Horticultural barn,	2,525 00	
Clark Hall,	67,400 00	
Durfee plant house and fixtures,	10,000 00	
Small plant house, with vegetable cellar and cold grapery,	4,700 00	
President's house,	6,700 00	
Dwelling houses purchased with farm,	5,100 00	
Power house,	12,000 00	
		$352,780 00

College Equipment (Estimated Value).

Botanical department,	$7,349 53
Horticultural department,	16,665 46
Farm,	20,599 95
Chemical laboratory,	3,441 28
Entomological laboratory,	2,064 48
Zoölogical museum,	6,150 00
Zoölogical laboratory,	3,300 00
Veterinary laboratory,	7,181 74
Physics and mathematics,	3,377 07
Dairy school,	1,394 10
Agricultural department,	2,948 44
English department,	74 00
Amount carried forward,	$74,546 05

Amount brought forward,	$74,546 05	
President's office,	1,007 93	
Dean's office,	74 00	
Treasurer's office,	800 00	
Text-books,	125 00	
Library,	51,067 55	
Military department,	679 80	
Fire apparatus,	259 60	
Heating and lighting,	45,247 74	
Dining hall,	2,078 96	
Normal department,	122 84	
		$176,009 47

Experiment Station Buildings (Estimated Value).

Agricultural laboratory,	$9,000 00	
Chemical laboratory (plant and animal chemistry),	20,000 00	
Entomological laboratory,	1,700 00	
		$30,700 00

Experiment Station Equipment (Estimated Value).

Director's office,	$1,911 86	
Treasurer's office,	257 50	
Agricultural laboratory,	6,522 95	
Entomological laboratory,	19,150 56	
Botanical laboratory,	3,688 88	
Chemical laboratory,	17,422 49	
Horticultural laboratory,	253 16	
		$49,207 40

Inventory Summary.

Land,	$44,350 00	
College buildings,	352,780 00	
College equipment,	176,009 47	
Experiment station buildings,	30,700 00	
Experiment station equipment,	49,207 40	
Total,		$653,046 87

STUDENTS' TRUST FUNDS ACCOUNTS.

ACCOUNTS.	Disbursements for Year ending Nov. 30, 1908.	Receipts for Year ending Nov. 30, 1908.	Balance brought forward Dec. 1, 1907.	Balance on Hand Nov. 30, 1908.
Dining hall,	$31,441 87	$28,981 38	—$2,430 31	—$4,890 80
Keys,	23 25	29 00	28 50	34 25
Students' deposits,	2,814 51	2,630 61	639 50	455 60
Trophy room tax,	304 25	399 00	80 01	174 76
Text-books,	2,709 04	2,723 15	864 08	878 19
Athletic board,	1,536 50	3,233 53	–	1,697 03
	$38,829 42	$37,996 67	—$818 22	—$1,650 97
Balance on hand Dec. 1, 1907,	—818 22	–	–	–
Balance on hand Nov. 30, 1908,	–	—1,650 97	–	–
	$39,647 64	$39,647 64	–	–

DETAILED STATEMENT OF DINING HALL.

	Liabilities.	Resources.
Dec. 1, 1907, inventory,	$1,428 81	–
Nov. 30, 1908, provisions purchased,	31,441 87	–
Nov. 30, 1908, outstanding bills,	1,642 28	–
Nov. 30, 1908, total collections,	–	$28,981 38
Nov. 30, 1908, total collections outstanding,	–	4,488 42
Nov. 30, 1908, inventory,	–	1,489 95
Balance,	446 79	–
	$34,959 75	$34,959 75

ENDOWMENT FUND.[1]

	Principal.	Income.
United States grant (5 per cent.),	$219,000 00	$7,300 00
Commonwealth grant (3½ per cent.),	142,000 00	3,313 32
		$10,613 32

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[1] This fund is in the hands of the State Treasurer, and the Massachusetts Agricultural College receives two-thirds of the income from the same.

BENEFICIARY FUNDS.

Burnham Emergency Fund.

	Principal.	Income
Two Lake Shore & Michigan Southern Railroad gold notes, par value,	$2,000 00	$100 00
Two bonds American Telegraph and Telephone Company 4's, par value,	2,000 00	–
One bond United Fruit, par value,	1,000 00	–
	$5,000 00	$100 00
These bonds, American Telegraph and Telephone and United Fruit, cost $2,747.38, leaving for further investment,	. . . .	252 62
		$352 62
Disbursements for prizes,	. . . .	110 00
Cash on hand Dec. 1, 1908,	. . . .	$242 62

Library Fund.

Five bonds Lake Shore & Michigan Southern Railroad 4's, par value,	$5,000 00	$200 00
Five bonds New York Central & Hudson River Railroad 4's, par value,	5,000 00	200 00
Two shares New York Central & Hudson River Railroad stock, par value,	200 00	10 50
Amherst Savings Bank,	167 77	6 68
	$10,367 77	$417 18
Transferred to library account,	. . . .	417 18

SPECIAL FUNDS.

Endowed Labor Fund (the Gift of a Friend of the College).

	Principal.	Income.
Two bonds American Telegraph and Telephone Company 4's, par value,	$2,000 00	$80 00
One bond New York Central Railroad debenture 4's, par value,	1,000 00	40 00
Two bonds Lake Shore & Michigan Southern Railroad 4's, par value,	2,000 00	80 00
Amherst Savings Bank,	143 39	5 72
	$5,143 39	$205 72
Unexpended balance Dec. 1, 1907,	. . . .	269 23
Cash on hand Dec. 1, 1908,	. . . .	$474 95

Whiting Street Scholarship Fund.

	Principal.	Income.
One bond New York Central Railroad debenture 4's, par value,	$1,000 00	$40 00
Amherst Savings Bank,	271 64	10 84
Unexpended balance Dec. 1, 1907,	–	58 61
	$1,271 64	$109 45
Disbursements for scholarships,	. . . .	71 00
Cash on hand Dec. 1, 1908,	. . . .	$38 45

Hills Fund.

		Principal.	Income.
Northampton Institution for Savings,		$1,180 00	$91 01
One bond American Telegraph and Telephone Company 4's, par value,		1,000 00	40 00
Three American Telephone Co's. notes, par value,		3,000 00	150 00
One bond New York Central & Lake Shore R.R. 3½'s, par value,		1,000 00	35 00
One bond New York Central & Hudson River Railroad debentures 4's, par value,		1,000 00	40 00
One bond New York Central & Hudson River Railroad gold note, 5 per cent, par value,		1,000 00	50 00
One bond Metropolitan Street Railway, Kansas City, 5 per cent., par value,		1,000 00	25 00
Boston & Albany Railroad stocks, par value,		362 00	31 68
Amherst Savings Bank,		72 75	2 88
Unexpended balance Dec. 1, 1907,		–	1,187 71
		$9,614 75	$1,653 28
Disbursements by horticultural and botanical departments,	$385 71		
Disbursements by purchase of one $1,000 bond of the Metropolitan Street Railway Company, 5 per cent.,	991 67	. . . .	1,377 38
Cash on hand Dec. 1, 1908,		. . . .	$275 90

Mary Robinson Fund.

	Principal.	Income.
Northampton Institution for Savings,	$820 00	$63 24
Boston & Albany Railroad stock, par value,	38 00	3 32
Unexpended balance Dec. 1, 1907,	–	32 75
	$858 00	$99 31
Disbursements for scholarships,	. . . .	72 00
Cash on hand Dec. 1, 1908,	. . . .	27 31

SPECIAL FUNDS — *Concluded.*

Grinnell Prize Fund.

	Principal.	Income.
Ten shares New York Central & Hudson River Railroad stock, par value,	$1,000 00	$52 50
Unexpended balance Dec. 1, 1907,	–	128 74
	$1,000 00	$181 24
Disbursements for prizes,	. . . .	60 00
Cash on hand Dec. 1, 1908,	. . . .	$121 24

Gassett Scholarship Fund.

One bond New York Central debentures 4's, par value,	$1,000 00	$40 00
Amherst Savings Bank,	11 64	44
Unexpended balance Dec. 1, 1907,	–	40 55
	$1,011 64	80 99
Disbursements for scholarships,	. . . .	23 50
Cash on hand Dec. 1, 1908,	. . . .	57 49

Massachusetts Agricultural College (Investment).

One share New York Central & Hudson River Railroad stock, par value,	$100 00	$5 25
Unexpended balance Dec. 1, 1907,	. . . .	27 75
Cash on hand Dec. 1, 1908,	. . . .	$33 00

Summary of Balances on Hand of the Income from Funds held in Trust by Massachusetts Agricultural College.

Burnham emergency,	$242 62	
Endowed labor fund,	474 95	
Whiting Street scholarship,	38 45	
Hills fund,	275 90	
Mary Robinson fund,	27 31	
Gassett scholarship,	57 49	
Grinnell prize,	121 24	
Massachusetts Agricultural College investment,	33 00	
Cash on hand Dec. 1, 1908,		$1,270 96

I hereby certify that I have this day examined the Massachusetts Agricultural College account, as reported by the treasurer, Fred C. Kenney, for the year ending Nov. 30, 1908. All bonds and investments are as represented in the treasurer's report. All disbursements are properly vouched for, and all cash balances are found to be correct.

CHARLES A. GLEASON,
Auditor.

AMHERST, Dec. 30, 1908.

THE M. A. C. BULLETIN

Vol. I. No. 2. For May, 1909.

Published Six Times a Year by the College.
Jan., Feb., Mar., May, Sept., Oct.

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CATALOGUE

OF THE

MASSACHUSETTS AGRICULTURAL COLLEGE,

1908-1909.

FORTY-SIXTH ANNUAL REPORT.

PART II.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 POST OFFICE SQUARE.
1909.

Without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life. — *Act of Congress, July 2, 1862.*

MASSACHUSETTS AGRICULTURAL COLLEGE,

AMHERST.

CATALOGUE, 1908-1909.

BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
18 POST OFFICE SQUARE.
1909.

APPROVED BY
THE STATE BOARD OF PUBLICATION.

Vacations and holidays are indicated by light-faced type.

1908

July

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

August

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

September

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

October

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

November

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

December

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

1909

January

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

February

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28						

March

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

April

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

May

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

June

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

July

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

August

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

September

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

October

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

November

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

December

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

1910

January

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

February

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28					

March

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

April

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

May

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

June

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

THE MASSACHUSETTS AGRICULTURAL COLLEGE.

CALENDAR.

1909.	
January 4, Monday, 1 P.M.,	Winter recess ends.
February 1, Monday,	Semester examinations begin.
February 8, Monday, 1 P.M.,	Second semester begins.
February 22, Monday,	Washington's birthday, holiday.
March 26, Friday, 6 P.M.,	Spring recess begins.
April 5, Monday, 1 P.M.,	Spring recess ends.
April 19, Monday,	Patriots' Day, holiday.
May [31, Monday],	Memorial Day, holiday.
June 7, Monday,	Senior examinations begin.
June 15, Tuesday,	Non-senior examinations begin.
June 19–23, Saturday–Wednesday,	Commencement exercises.
June 24–25, Thursday–Friday,	Entrance examinations.
SUMMER VACATION.	
September 13–14, Monday–Tuesday,	Entrance examinations.
September 13–15, Monday–Wednesday,	Condition examinations.
September 15, Wednesday, 9.30 A.M.,	First semester begins; assembly.
November 24–29, Wednesday, 1 P.M.–Monday, 1 P.M.,	Thanksgiving recess.
December 17, Friday, 6 P.M.,	Winter recess begins.
1910.	
January 3, Monday, 1 P.M.,	Winter recess ends; assembly.
January 31, Monday,	Semester examinations begin.
February 7, Monday, 1 P.M.,	Second semester begins; assembly.
February 22, Tuesday,	Washington's Birthday, holiday.
March 25, Friday, 6 P.M.,	Spring recess begins.
April 4, Monday, 1 P.M.,	Spring recess ends; assembly.
April 19, Tuesday,	Patriots' Day, holiday.
May 30, Monday,	Memorial Day, holiday.
June 6, Monday,	Senior examinations begin.
June 14, Tuesday,	Non-senior examinations begin.
June 18–22, Saturday–Wednesday,	Commencement exercises.
June 23–24, Thursday–Friday,	Entrance examinations.

MASSACHUSETTS AGRICULTURAL COLLEGE.

HISTORY. — The Massachusetts Agricultural College was among the colleges established under the national land grant act of 1862. This act gave public lands to the several States and Territories for the establishment of colleges for the benefit of agriculture and the mechanic arts; it was framed by the late Senator Justin Smith Morrill of Vermont. For our own college, liberal appropriations are also made by the Legislature of Massachusetts.

The college was incorporated in 1864, and on the 2d of October, 1867, was formally opened to an entering class of 33. In January, 1875, an arrangement was made with the authorities of Boston University under which the college, without losing its independence, became the school of agriculture of the university. Under this arrangement, graduates of the Massachusetts Agricultural College may, upon certain conditions, receive the diploma in science awarded to graduates of the university. In 1882 the State experiment station was located at the college. It has since been incorporated with the college.

COURSES. — The college offers a free education to any American student who may fulfill the requirements of admission. Women are admitted on the same standing as men. Foreign students pay a tuition fee. The four-years course leads to the degree of bachelor of science, and graduate courses are given leading to the degrees of master of science and of doctor of philosophy. Winter courses of ten weeks are offered, and, upon announcement, special courses. There is also a summer school of agriculture, designed chiefly for persons desiring to teach agriculture in the elementary and high schools.

PURPOSE OF THE COLLEGE. — The chief purpose of the college is to prepare men and women for the agricultural vocations. In this statement, the term "agricultural" is used in the broadest sense. Courses are offered which give efficiency in various practical pursuits, such as general farming, dairying, the management of estates, fruit growing, glass farming, landscape gardening, forestry and arboriculture. Students also qualify for positions in institutions designed for investigation in the many sciences underlying the great agricultural industry, for teaching in agricultural colleges and high schools, and for business occupations having connection with the farm and needing expert service.

Though the agricultural vocations are thus the chief concern of the college, students also find the course one that fits them admirably for pursuits in which the sciences — particularly chemistry, physics, mathematics and engineering — are an essential preparation. Still other students find the course a splendid general education, without regard to future occupation. The course is well balanced; each student is required to study English, a modern foreign language, literature, political science and history.

Location and Equipment. — Situated in the beautiful town of Amherst, the college has an inspiring outlook. The campus is especially attractive. The grounds comprise more than 400 acres, lying about a mile north of the village center. The equipment of the college, both in buildings and facilities for instruction, is excellent. Amherst, 97 miles west of Boston, is on the Central Vermont Railroad and the Central Massachusetts division of the Boston & Maine Railroad. Electric car lines connect the village with Northampton, Holyoke, Springfield and other cities. The town library is open to students, in addition to the college library, as are also good courses of lectures and concerts in the village, supplementing the various interests of college life.

THE MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION.

Massachusetts provided for the establishment of an agricultural experiment station in 1882. This station, though on the college grounds and supported by the State, was without organic connection with the college. Under an act of Congress, passed in 1887, an agricultural experiment station was established as a department of the college. It was supported by the general government. For a time, therefore, Massachusetts had two experiment stations at the college. In 1894 these were combined, and the station reorganized as a department of the college. It is now supported by funds from both the State and the general government. In 1906 the general government largely increased its support of experiment stations, on condition, however, that the money thus provided should be used only for research. The station now receives about two-fifths of its support from the State.

The station is under the direct supervision of the Board of Trustees. The chief officer is the director, who is responsible to the president and to the committee of the Board. The station is organized into a number of departments, all co-operating toward the betterment of agriculture. In most cases the heads of the station departments are heads of corresponding departments in the college. The work of the station takes three directions; namely, control work, extension work and investigation. The station publishes numerous bulletins and two annual reports, one scientific, the other for practical farmers and for general distribution. These publications, conveying information as to results of experiments, are free, and circulate extensively, the mailing list containing some 20,000 addresses.

THE CORPORATION.

MEMBERS OF THE CORPORATION.

	TERM EXPIRES
FRANK GERRETT of Greenfield,	1910
SAMUEL C. DAMON of Lancaster,	1910
THOMAS L. CREELEY of Belmont,	1911
CHARLES H. PRESTON of Danvers,	1911
CARROLL D. WRIGHT[1] of Worcester,	1912
M. FAYETTE DICKINSON of Boston,	1912
WILLIAM H. BOWKER of Boston,	1913
GEORGE H. ELLIS of Boston,	1913
J. HOWE DEMOND of Northampton,	1914
ELMER D. HOWE of Marlborough,	1914
NATHANIEL I. BOWDITCH of Framingham,	1915
WILLIAM WHEELER of Concord,	1915
ARTHUR G. POLLARD of Lowell,	1916
CHARLES A. GLEASON of New Braintree,	1916

MEMBERS EX OFFICIO.

His Excellency Governor EBEN S. DRAPER,
President of the Corporation.

KENYON L. BUTTERFIELD, *President of the College.*

GEORGE H. MARTIN, *Secretary of the Board of Education.*

J. LEWIS ELLSWORTH, *Secretary of the Board of Agriculture.*

OFFICERS OF THE CORPORATION.

His Excellency Governor EBEN S. DRAPER of Boston,
President.

CHARLES A. GLEASON of New Braintree, *Vice-President.*

J. LEWIS ELLSWORTH of Worcester, *Secretary.*

FRED C. KENNEY of Amherst, *Treasurer.*

CHARLES A. GLEASON of New Braintree, *Auditor.*

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[1] Died Feb. 20, 1909; succeeded by Davis R. Dewey of Cambridge.

Standing Committees of the Corporation.[1]

Committee on Finance.

Charles A. Gleason, *Chairman.*
George H. Ellis.
Arthur G. Pollard.
J. Howe Demond.
Charles H. Preston.

Committee on Course of Study and Faculty.

William Wheeler, *Chairman.*
William H. Bowker.
M. Fayette Dickinson.
George H. Martin.
Elmer D. Howe.
Carroll D. Wright.[2]

Committee on Farm and Horticulture.

Farm Division.

George H. Ellis, *Chairman.*
Frank Gerrett.
Charles A. Gleason.
Nathaniel I. Bowditch.

Horticulture Division.

J. Lewis Ellsworth, *Chairman.*
Thomas L. Creeley.
Elmer D. Howe.

Committee on Experiment Department.

Charles H. Preston, *Chairman.*
J. Lewis Ellsworth.
William H. Bowker.
Arthur G. Pollard.
Samuel C. Damon.

Committee on Buildings and Arrangement of Grounds.

M. Fayette Dickinson, *Chairman.*
William Wheeler.
Frank Gerrett.
William H. Bowker.
Nathaniel I. Bowditch.

Examining Committee of Overseers.

John Bursley of West Barnstable, *Chairman.*
Warren C. Jewett of Worcester.
Isaac Damon of Wayland.
Frank Gerrett of Greenfield.
Noble B. Turner of Great Barrington.

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[1] The president of the college is ex-officio member and secretary of standing committees. The director of the experiment station is a member of the committee on experiment department, without vote.

[2] Died Feb. 20, 1909; succeeded by Davis R. Dewey of Cambridge.

OFFICERS OF THE INSTITUTION.

THE FACULTY.

[The names of the faculty are arranged in groups according to rank. Within these groups, the order depends upon seniority of service in the college, not upon seniority of appointment to the position now held.]

KENYON L. BUTTERFIELD, A.M., President of the College and Professor of Rural Sociology, 25 Sunset Avenue.

GEORGE F. MILLS, M.A., Dean of the College, Head of the Division of the Humanities and Professor of Languages and Literature, 46 Amity Street.

CHARLES H. FERNALD, Ph.D., Director of the Graduate School and Professor of Zoölogy, 3 Hallock Street.

WILLIAM P. BROOKS, Ph.D., Director of the Experiment Station and Lecturer on Soil Fertility, Massachusetts Agricultural College.

FRANK A. WAUGH, M.Sc., Head of the Division of Horticulture and Professor of Landscape Gardening, Massachusetts Agricultural College.

JAMES A. FOORD, M.Sc., Acting Head of the Division of Agriculture and Professor of Farm Administration, Nutting Avenue.

CHARLES A. GOESSMANN, Ph.D., LL.D., Honorary Professor of Chemistry and Honorary Director of the Experiment Station, 40 Pleasant Street.

CHARLES WELLINGTON, Ph.D., Professor of General and Agricultural Chemistry, 34 Amity Street.

JAMES B. PAIGE, B.Sc., D.V.S., Professor of Veterinary Science, 42 Lincoln Avenue.

GEORGE E. STONE, Ph.D., Professor of Botany, Mt. Pleasant.

JOHN E. OSTRANDER, A.M., C.E., Professor of Mathematics and Civil Engineering, 33 North Prospect Street.

HENRY T. FERNALD, Ph.D., Professor of Entomology, 44 Amity Street.

GEORGE C. MARTIN, C.E., Captain 18th United States Infantry, Professor of Military Science and Tactics, Amherst House.

WILLIAM R. HART, A.M., Professor of Agricultural Education, 97 Pleasant Street.

FRED C. SEARS, M.Sc., Professor of Pomology, Mt. Pleasant.

PHILIP B. HASBROUCK, B.Sc., Associate Professor of Mathematics, Adjunct Professor of Physics and Registrar of the College, 130 Pleasant Street.

FRED C. KENNEY, Treasurer, Mt. Pleasant.

S. FRANCIS HOWARD, M.Sc., Assistant Professor of Chemistry, 10 Allen Street.

A. VINCENT OSMUN, M.Sc., Assistant Professor of Botany, North Amherst.

GEORGE N. HOLCOMB, A.B., S.T.B., Assistant Professor of Political Science, North Amherst.

Clarence E. Gordon, B.Sc., A.M., Assistant Professor of Zoölogy and Curator of the Zoölogical Museum, North Amherst.

Robert Wilson Neal, A.M., A.M., A.M., Assistant Professor of English, 7 Woodside Avenue.

Edward A. White, B.Sc., Assistant Professor of Floriculture, 55 Pleasant Street.

Percy L. Reynolds, M.D., Assistant Professor of Physical Education and Hygiene, North Amherst.

William P. B. Lockwood, B.S.Agr., Assistant Professor of Dairying, 5 East Pleasant Street.

Robert W. Lyman, B.Sc., LL.B., Lecturer on Farm Law, Northampton.

Frank W. Rane, M.Sc., Lecturer on Forestry, State House, Boston.

Robert D. MacLaurin, Ph.D., Lecturer on Organic Chemistry, 6 Kellogg Avenue.

Sidney B. Haskell, B.Sc., Instructor in Agronomy, 12 Cottage Street.

Harold F. Tompson, B.Sc., Instructor in Market Gardening, Massachusetts Agricultural College.

Ray L. Gribben, B.S.A., Instructor in Animal Husbandry, 66 Pleasant Street.

Floyd B. Jenks, B.S.Agr., Instructor in Agricultural Education, 97 Pleasant Street.

Edgar L. Ashley, A.M., Instructor in German, 12 Lincoln Avenue.

Anderson A. Mackimmie, A.B., Instructor in French and Spanish, North Amherst.

C. Robert Duncan, B.Sc., Instructor in Mathematics and Physics, 46 Pleasant Street.

Charles R. Green, B.Agr., Librarian, Mt. Pleasant.

Alexander E. Cance, Ph.D., Instructor in Agricultural Economics, 9 Fearing Street.

Frank M. Gracey, Assistant in Landscape Gardening, 56 Pleasant Street.

Ernest C. Fowler, B.S., Assistant in Chemistry, 15 Amity Street.

Harry M. Jennison, B.Sc., Assistant in Botany, 66 Pleasant Street.

Leon I. Shaw, M.Sc., Assistant in Chemistry, 66 Pleasant Street.

Other College Officers.

Edwin H. Forristall, M.Sc., Farm Superintendent, Massachusetts Agricultural College.

Ralph J. Watts, B.Sc., Secretary to the President, 116 Pleasant Street.

Newton Wallace, Electrician, 6 Phillips Street.

Clarence A. Jewett, Superintendent of Buildings, 16 Whitney Street.

Miss Clara L. Stuart, Correspondence Clerk, Draper Hall.

Miss Mary E. Caldwell, Bookkeeper, Treasurer's Office, Draper Hall.

Miss Henrietta Webster, Clerk, Treasurer's Office, 79 Pleasant Street.

Miss Edith C. Hubley, Stenographer, Division of Horticulture, Draper Hall.

Miss Gertrude Warner, Stenographer, Division of Agriculture, Draper Hall.

Additional Instructors for the Summer School, 1908.

Dr. W. D. Hurd, Professor in the University of Maine: Field Crops and Agricultural Industry.

Dr. T. N. Carver, Professor in Harvard University: Agricultural Economics.

A. C. Monahan, Principal of the Turners Falls High School: High School Chemistry.

Prof. W. H. Dudley, of the Wisconsin Normal School: Bird Life.

Additional Instructors for the Winter Course, 1909.

Nathan J. Hunting, B.Sc., Instructor in the Use of Separators.

Samuel Coons, Instructor in Butter Making.

John N. Summers, B.Sc., Instructor in Entomology.

Newton Wallace, Instructor in Dairy Mechanics.

Graduate Assistants.

John N. Summers, B.Sc., Assistant in Entomology.

OFFICERS OF THE EXPERIMENT STATION.

Charles A. Goessmann, Ph.D., LL.D., Honorary Director and Expert Consulting Chemist, 40 Pleasant Street.

William P. Brooks, Ph.D., Director, Massachusetts Agricultural College.

Fred C. Kenney, Treasurer, Mt. Pleasant.

Charles R. Green, B.Agr., Librarian, Mt. Pleasant.

Department of Plant and Animal Chemistry.

Joseph B. Lindsey, Ph.D., Chemist, 47 Lincoln Avenue.

Edward B. Holland, M.Sc., Associate Chemist, in Charge of Research Division, 28 North Prospect Street.

Henri D. Haskins, B.Sc., In Charge of Fertilizer Division, 87 Pleasant Street.

Robert D. MacLaurin, Ph.D., First Assistant in Research Division, 6 Kellogg Street.

Philip H. Smith, B.Sc., In Charge of Feed and Dairy Division, 102 Main Street.

Roy F. Gaskill, Assistant in Animal Nutrition, Massachusetts Agricultural College.

Lewell S. Walker, B.Sc., Assistant, 19 Phillips Street.

Philip V. Goldsmith, B.Sc., Assistant, 32 North Prospect Street.

James C. Reed, B.Sc., Assistant, 19 Phillips Street.

James P. Howard, Inspector.

Department of Agriculture.

William P. Brooks, Ph.D., Agriculturist, Massachusetts Agricultural College.

Erwin S. Fulton, B.Sc., First Assistant Agriculturist, North Amherst.

Edwin F. Gaskill, B.Sc., Second Assistant Agriculturist, Mr. Goldberg's.

Department of Horticulture.

Frank A. Waugh, M.Sc., Horticulturist, Massachusetts Agricultural College.

Fred C. Sears, M.Sc., Pomologist, Mt. Pleasant.

Jacob K. Shaw, M.Sc., Assistant Horticulturist, Amherst House Annex.

Department of Botany and Vegetable Pathology.

George E. Stone, Ph.D., Botanist and Vegetable Pathologist, Mt. Pleasant.

George H. Chapman, B.Sc., Assistant Botanist, Fearing Street.

DEPARTMENT OF ENTOMOLOGY.

CHARLES H. FERNALD, Ph.D., Entomologist, 3 Hallock Street.
HENRY T. FERNALD, Ph.D., Associate Entomologist, 44 Amity Street.
JOHN N. SUMMERS, B.Sc., Assistant Entomologist, 66 Pleasant Street.

DEPARTMENT OF VETERINARY SCIENCE.

JAMES B. PAIGE, B.Sc., D.V.S., Veterinarian, 42 Lincoln Avenue.

DEPARTMENT OF METEOROLOGY.

JOHN E. OSTRANDER, A.M., C.E., Meteorologist, 33 North Prospect Street.
ROCKWOOD C. LINDBLAD, Observer, Massachusetts Agricultural College.

OTHER OFFICERS OF THE EXPERIMENT STATION.

Miss ROSE J. BROWN, Secretary to the Director, Draper Hall.
Miss JESSIE V. CROCKER, Stenographer, Department of Botany and Vegetable Pathology, Sunderland.
Miss HARRIET COBB, Stenographer, Department of Plant and Animal Chemistry, 33 Cottage Street.
Miss BRIDIE O'DONNELL, Stenographer, Department of Entomology, Amherst.

COMMITTEES OF THE FACULTY.

INSTRUCTION.[1]

Professor MILLS, *Chairman.*
Professor WELLINGTON.
Professor OSTRANDER.
Professor WAUGH.
Professor HART.
Professor FOORD.

ENTRANCE EXAMINATIONS AND ADMISSION.[1]

The REGISTRAR, *Chairman.*
Assistant Professor HOWARD.
Assistant Professor GORDON.
Assistant Professor NEAL.
Assistant Professor HOLCOMB.

GRADUATE SCHOOL.[1]

Professor C. H. FERNALD, *Chairman.*
Professor WELLINGTON.
Professor STONE.
Professor H. T. FERNALD.
Professor WAUGH.
Professor MILLS.

STUDENT ACTIVITIES.[1]

The DEAN, *Chairman.*
Professor STONE.
Captain MARTIN.
Professor SEARS.
Mr. GRIBBEN.

ATHLETICS.[1]

Professor PAIGE, *Chairman.*
Assistant Professor REYNOLDS.
Assistant Professor GORDON.

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[1] The president is ex officio a member.

CATALOGUE AND OTHER PUBLICATIONS.[1]

Assistant Professor NEAL, *Chairman.*
Assistant Professor OSMUN.
Professor OSTRANDER.

LIBRARY.[1]

Professor Stone, CHAIRMAN.
Professor BROOKS.
Professor H. T. FERNALD.
The TREASURER.

SCHEDULE.[1]

Professor OSTRANDER, *Chairman.*
Professor PAIGE.

ADVISORY COMMITTEE ON STUDENT LABOR.

The TREASURER, *Chairman.*
The DEAN.
The REGISTRAR.

ADVISORY COMMITTEE ON DISCIPLINE.

The DEAN, *Chairman.*
The REGISTRAR.
The TREASURER.
The COMMANDANT.

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[1] The president is ex officio a member.

THE COLLEGE.

ADMISSION.

A. APPLICATION FOR ADMISSION.

Correspondence about admission should be addressed to the registrar.

Every applicant for admission to the college must be at least sixteen years old, and must present to the registrar proper testimonials of good character. Such testimonials, whenever possible, should come from the principal of the school at which the applicant has prepared for college. If an applicant desires a free State scholarship, he must also present to the registrar a certificate of appointment from the State senator of his district. All entrance credentials must be in the hands of the registrar before the applicant can matriculate.

B. MODES OF ADMISSION.

Students are admitted to the freshman class either upon *certificate* or upon *examination*. No *diploma* from a secondary school will be considered.

CERTIFICATES. — The entrance requirements may be satisfied by certification in any of the following ways: —

1. By presenting certificate from a school approved for such privilege by this college.

2. By presenting certificate from any school approved by the college entrance examination boards.

3. By presenting the customary credentials from the Board of Regents of the State of New York for any of the subjects of the entrance requirements.

Certificates must present at least three of the six required subjects for admission, and not less than seven of the necessary fourteen credits in all. Those subjects lacking on certificate (except for the permitted number of conditions) must be made up at the time of the examinations for admission.

Blank forms for certification — sent to principals or school superintendents only — may be obtained on application to the registrar of the college.

EXAMINATIONS. — The examination in each subject may be oral or written, or both. The standard required for passing an examination for admission is 65 per cent. A candidate deficient in both algebra and plane geometry will not be admitted. For the fall of 1909 conditions to the amount of three and one-half units will be allowed; for the fall of 1910 conditions to the amount of two and one-half units; for the fall of 1911 and the following years conditions to the amount of two units will be allowed.

Places of Examination. — Examinations for admission to the college are held as follows: —

In June of each year: in Amherst, in the building of the Department of Mathematics, Massachusetts Agricultural College; in Boston, in the College of Liberal Arts of Boston University, Boylston Street, corner of Exeter; in Worcester, in Horticultural Hall; in Pittsfield, in the City Hall.

In September of each year: in Amherst only, in the building of the Department of Mathematics, Massachusetts Agricultural College.

Time Schedule for Examinations, 1909. — The examinations for entrance in 1909 will be held on the following dates: —

In June, on Thursday, June 24, and Friday, June 25.

In September, on Monday, September 13, and Tuesday, September 14.

The schedule for examination in both June and September will be as follows: —

First Day.

8.30 A.M.	Registration.
9.00 A.M.	Chemistry, solid geometry.
11.00 A.M.	United States history and civics.
2.00 P.M.	Plane geometry.
4.00 P.M.	History, elective.

Second Day.

8.30 A.M.	Algebra.
10.30 A.M.	Physiology, chemistry.
2.00 P.M.	English.
4.30 P.M.	French or German.

C. Requirements for Admission.

In June and September, 1909, candidates for admission upon certificate may offer themselves under the requirements announced in the catalogue of 1907-08 (see Addenda, "Examinations in 1909"), or under those here stated; but candidates for admission upon examination will not be examined except according to the announcements of the earlier catalogue.

The following requirements will therefore be in force in 1909 for certification only, but thereafter for both certification and examination.

The requirements for admission are based on the completion of a four-years course in a high school or its equivalent, and are stated in terms of units. The term unit means the equivalent of five recitations a week for a school year. Fourteen units must be offered for admission, of which nine are required and five are elective.

(*a*) The following nine units are required: —

Language.

English,	3
French or German,	2

History and Civics.

United States history and civics,	½
History (elective),	1
(*a*) Ancient history.	
(*b*) Medieval and modern history.	
(*c*) English history.	
(*d*) General history.	

Mathematics.

Algebra, through progressions,	1½
Plane geometry,	1

(*b*) In addition to the requirements under (*a*), five units must be offered from the following-named elective subjects. Not more than four of those subjects in which the credit sought is one-half unit will be accepted.

Language.

English in addition to requirements,	1
French in addition to requirements,	2 or 1[1]
German in addition to requirements,	2 or 1[1]
Greek,	2 or 3
Latin,	2 or 3

History.

In addition to requirements,	1 or 2

Mathematics, and Other Sciences.

Solid geometry,	½
Trigonometry,	½
Chemistry,	1
Physiography,	½
Physiology,	½

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[1] If but one elective unit be offered, it must be in the same language as that offered to meet the two-year language requirement.

Agriculture,[1]	½ or 1
Botany,[1]	½ or 1
Geology,[1]	½
Physics,[1]	1
Zoölogy,[1]	½
Commercial geography,[2]	½
Drawing,[2]	½
Manual training,[2]	½ or 1

PRESENTATION OF NOTE-BOOKS.—In specified subjects, the keeping of note-books is required as part of the preparation. If an applicant present a certificate in any one of these subjects, the certificate must state that the note-book has been satisfactorily prepared, but the note-book itself is not to be submitted; but if the applicant takes an examination, he must submit the note-book itself, at the same time as and as part of the examination; and note-books so presented must themselves be certified by the principal.

D. STATEMENT[3] OF PREPARATION REQUIRED FOR ADMISSION.

AGRICULTURE. — Owing to the wide divergence of the methods of teaching agriculture in the public schools, the student will be required to bring a statement from the principal of the amount and kinds of work accomplished and of the text-books used. The examination will be based somewhat upon this information; but it will call for not less than one-half year of creditable work of high school grade.

BOTANY. — For one unit of credit in botany, the work outlined in the statement of requirements issued by the College Entrance Examination Board (address sub-station 84, New York City), or its equivalent, will be accepted. This work should occupy one school year and include laboratory and supplementary text-book study. For one-half unit of credit, work that covers the same ground but occupies half the time required for a full unit of credit will be accepted. A note-book containing neat, accurate drawings and descriptive records forms part of the requirement for either the half unit or the one unit credit; and this note-book must be presented by all applicants for admission upon examination in this subject. The careful preparation of an herbarium is recommended to all prospective students of this college, although the herbarium is not required.

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[1] Note-books required as part of preparation in these subjects; must be presented, properly certified, at examination; must be certified to but not presented in case of admission on certificate.

[2] Certification necessary in these subjects; no examinations given.

[3] In alphabetical order by subjects.

Chemistry. — The entrance examination in chemistry will cover the work outlined by the College Entrance Examination Board as preparatory for college entrance. In general, this consists of a year of high school chemistry from such text-books as Newell's "Descriptive Chemistry" or Remsen's "Elements of Chemistry," with laboratory work on the general properties of the common elements, some of the experiments being quantitative. The keeping of a note-book is required.

Commercial Geography. — Preparation should be given in a course equivalent to that laid down in Adams's "Commercial Geography," Trotter's "Geography of Commerce," or a similar work.

Drawing. — Applicants may offer either freehand or mechanical drawing, or both. They must be able to make an accurate freehand sketch, in either outline or light and shade, of the appearance of a group of geometric solids, and have a sufficient knowledge of perspective to enable them to draw correctly a simple geometric model from memory; or, if they present mechanical drawing, they must have considerable working familiarity with drawing instruments, and be able to make an accurate inked working drawing, in orthographic projection, of some simple object. Emphasis is laid on facility in doing good freehand lettering. For a limitation of the work that may be presented see Manual Training.

English. — In English, preparation for entrance to the college will best be made according to the recommendations of the Conference on Uniform Entrance Requirements in English, as embodied in the requirements stated by the College Entrance Examination Board (address sub-station 84, New York City).[1] Ability to think clearly, and to spell, punctuate and paragraph creditably, is indispensable. For the rhetorical study, a simple text is sufficient; but much practice in composition should be given.[2] Direct questions may be put, and tests in grammar will be included. Preparation should extend to both lists of books; and, in addition to this preparation, each candidate should be able to paraphrase or interpret with some insight unfamiliar verse or prose of medium difficulty; such a test of his ability to understand language independently will be included in the examination.

The following list of books, made up from the list recommended by the Conference on Uniform Entrance Requirements in English, enumerates the works recommended by the Conference of New England Colleges. The examination will be based upon these; but an applicant who has prepared upon other books of the longer list will be examined thereon if he notify the Department of English of his wish before the first day of February preceding the examinations.

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[1] As a member of the Conference of New England Colleges on Entrance Examinations in English, this college will adapt itself to the policy of that conference.

[2] Upon request, the Department of English will send a leaflet containing fuller explanations and suggestions, recommendations about the fourth (elective) credit, and a definition of the term "credit unit" as it concerns English.

(*a*) For reading and composition practice — Shakspere's "Merchant of Venice" and "Julius Cæsar;" the "Sir Roger de Coverley Papers" in "The Spectator;" Franklin's "Autobiography;" Scott's "Ivanhoe;" Hawthorne's "House of the Seven Gables;" Dickens's "A Tale of Two Cities;" Scott's "The Lady of the Lake;" Macaulay's "Lays of Ancient Rome;" Tennyson's "Gareth and Lynette," "Lancelot and Elaine" and "The Passing of Arthur."

(*b*) For detailed study and practice — Shakspere's "Macbeth;" Milton's "Lycidas," "Comus," "L'Allegro" and "Il Penseroso;" Burke's "Speech on Conciliation with America," or Washington's "Farewell Address" and Webster's "First Bunker Hill Oration;" Macaulay's "Life of Johnson" or Carlyle's "Essay on Burns."

French. — The necessary preparation for this examination is stated in the description of the two-year course in elementary French recommended by the Modern Language Association, contained in the definition of requirements of the College Entrance Examination Board (sub-station 84, New York City).[1]

Third and fourth year French (elective subjects for admission). — For a single credit unit in French as an elective subject for entrance, the work described by the College Entrance Examination Board as "intermediate" is expected. For two credit units, the work described as "intermediate" and "advanced" is expected.

Geology. — Grouped with zoölogy, which see.

German. — The entrance requirements in German conform to those of the College Entrance Examination Board for elementary German (the standard two-years requirements).[1]

Third and fourth year German (elective subjects for admission). — For a single credit unit in German as an elective subject for entrance, the work described by the College Entrance Examination Board as "intermediate" is expected. For two credit units, the work described as "intermediate" and "advanced" is expected.

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[1] A leaflet giving fuller information may be had by applying to the Department of Modern European Languages.

Greek. — Greek will receive credit as an elective requirement upon either examination or certification, as follows: —

1. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from the first two books of Xenophon's "Anabasis;" and (*b*) the translation of passages of Attic prose at sight.

2. Three credit units will be allowed if, in addition to the above, satisfactory proficiency is shown in (*a*) the translation of a passage or passages selected from the first book of Homer's "Iliad," and (*b*) translation of passages of Homer's "Iliad" at sight, with questions on the forms and constructions of the passages.

History. — Of the one and one-half required units the one-half unit must be offered in United States history and civics, and the one required unit must be offered in either ancient history, medieval and modern history, English history or general history. Either one or two elective units in any one of the historical subjects here named may be offered, provided that such units may not be offered in the same subject in which the required unit has been offered.

Preparation in history will be satisfactory if made in accordance with the recommendations of the committee of seven of the American Historical Association, as outlined by the College Entrance Examination Board (sub-station 84, New York City). The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory, and it will presuppose the use of good text-books, collateral reading and practice in written work. Geographical knowledge may be tested by requiring the location of places and movements on an outline map.

Latin. — Latin will receive credit as an elective requirement by either examination or certification, as follows: —

1. Two credit units will be allowed if satisfactory proficiency is shown (including grammar) in (*a*) the translation of a passage or passages taken from Cæsar's "Gallic War," books I. to IV., or an equivalent, and from Cicero's "Orations against Catiline;" and (*b*) the translation of passages of Latin prose at sight.

2. Three credit units will be allowed if, in addition to the above, satisfactory proficiency is shown in (*a*) the translation of a passage or passages selected from books I. and II. of Virgil's "Æneid;" and (*b*) translation into Latin prose of a passage of connected English narrative based on some portion of Cæsar's "Gallic War," books I. to IV.

Manual Training. — An entrance credit of one-half or one unit is allowed for manual training, on the presentation of a certificate from the principal of the school showing the scope and character of the applicant's work. The preparation may include mechanical drawing, working in wood, metals, leather, etc. When mechanical drawing is presented as a part of the work in manual training, no other credit for drawing will be allowed. No examination is given in this subject; applicants must present certificates to secure credit.

MATHEMATICS. — (*a*) *Required.* — Algebra: The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one or more unknown quantities; problems depending on linear equations; radicals, including the extraction of the square root of polynomials and numbers; exponents, including the fractional and negative; quadratic equations, both numerical and literal; simple cases of equations with one or more unknown quantities that can be solved by the methods of linear or quadratic equations; problems depending upon quadratic equations; the binomial theorem for positive integral exponents; the formulas for the *n*th term and the sum of the terms of arithmetic and geometric progressions, with applications.

Plane Geometry: The usual theorems and constructions of good text-books, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle; the solution of numerous original exercises, including loci problems; applications to the mensuration of lines and plane surfaces.

(*b*) *Elective.* — Solid Geometry: The usual theorems and constructions of good text-books, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders and cones; the sphere and spherical triangle; the solution of numerous original exercises, including loci problems; applications to the mensuration of surfaces and solids.

Plane Trigonometry: A knowledge of the definitions and relations of trigonometric functions and of circular measurements and angles; proofs of the principal formulas and the application of these formulas to the transformation of the trigonometric functions; solution of trigonometric equations, the theory and use of logarithms, and the solution of right and oblique triangles.

PHYSICS. — To satisfy the entrance requirement in physics, the equivalent of at least one unit of work is required. This work should consist of both class-room work and laboratory practice. The work covered in the class room should be equal to that outlined in Hall & Bergen's "Text-book of Physics;" the laboratory work should represent at least thirty-five experiments involving careful measurements, with accurate recording of each in laboratory note-book. This note-book, certified by the instructor in the subject, must be submitted by each candidate presenting himself for examination in physics; credit for passing the subject will be given on laboratory notes and on the examination paper submitted. Candidates entering on certificate will not be required to present note-books, but the principal's certification must cover laboratory as well as class-room work.

PHYSIOGRAPHY and PHYSIOLOGY. — Grouped with Zoölogy, which see.

ZOÖLOGY, PHYSIOGRAPHY, GEOLOGY, PHYSIOLOGY. — The following suggestions are made concerning preparation for admission in the subjects named above: —

For physiography, Davis's "Elementary Physical Geography," Gilbert & Brigham's "Introduction to Physical Geography." For physiology, Hough & Sedgwick's "The Human Mechanism," Martin's "The Human Body; Briefer Course." For zoölogy, text-books entitled "Animals" or "Animal Studies," by Jordan, Kellogg and Heath; Linville & Kelley's "A Text-book in General Zoölogy."

Applicants for examination in zoölogy and geology are *required* to present certified laboratory note-books; applicants for examination in the other subjects are *advised* to present a note-book, if laboratory work has been done. Good note-books may be given credit for entrance. Examination in these subjects will be general, and some option will be given the student among questions, in recognition of the different methods of conducting courses; but students will be examined on the basis of the most thorough secondary school courses.

E. ADMISSION TO ADVANCED STANDING.

Candidates for admission to advanced standing, in addition to meeting the regular entrance requirements, must also pass examinations in those subjects already pursued by the class they desire to enter. To meet this requirement, a student transferring to this college from another college or university of recognized standing must present the following credentials: —

1. A letter of honorable dismissal from the institution with which he has been connected.

2. A statement or certificate of his entrance record.

3. A statement from the proper officer showing a complete record of his work while in attendance.

4. A marked catalogue showing the courses pursued.

These credentials should be presented to the registrar. Applications will be judged wholly on their merits and the college may prescribe additional tests before accepting applicants or determining the standing to be granted them.

F. Other Information about Entrance.

1. The privileges of the college may be withdrawn from any student at any time if such action is deemed advisable. (It is immaterial whether the pupil has entered by certificate or by examination.)

2. The examination in each subject may be either oral or written, or both. The standard required for passing an entrance examination is 65 per cent.

3. Candidates must in 1909 receive credit for at least ten and one-half units; in 1910, for eleven and one-half units; and thereafter for twelve units out of the total number required for entrance, and will be conditioned in those subjects not passed. No candidate deficient in both algebra and plane geometry will be admitted.

4. Opportunities for removing entrance conditions are given six weeks after the opening of the college year. If a student fail at that time to clear his record of conditions, he may be given a second opportunity two weeks before the close of the first semester of the freshman year.

5. Credits for entrance requirements, whether gained by certificate or by examination, will hold good for one year.

6. Preliminary examinations in part of the subjects required for entrance may be taken one year before entering college.

7. Students not candidates for a degree (unclassified students) are admitted under the following provisions: —

(*a*) No entrance examination is required, but applicants must bring certificates showing that they have finished a four-years high school course or its equivalent, and furnish satisfactory testimonials as to moral character.

(*b*) No applicant under twenty-one years of age will be admitted as an unclassified student.

(*c*) Each unclassified student must take from the regular courses a minimum of twelve credit hours a week.

(*d*) In order to be admitted to any course, an unclassified student must have had all prerequisite subjects for that course.

(*e*) Every unclassified student must do all the work of the courses elected, and take all examinations therein. In order to pass such courses he must attain a grade of at least 75 per cent. An unclassified student who passes in less than two-thirds of his work will be dropped from college.

(*f*) All unclassified students are subject to the supervision of a special committee.

(*g*) Any unclassified student may be dropped from college at any time if his presence in any class is undesirable or his work is unsatisfactory; and no unclassified student will be allowed to remain in college more than four semesters without the special permission of the faculty.

(*h*) Unclassified students are subject to the regulations applying to classified students.

8. For information concerning expenses, scholarships, etc., see "General Information."

9. For information concerning admission to short courses see "Short Courses."

COURSES OF INSTRUCTION.

A. TABLE OF UNDERGRADUATE SUBJECTS.

[The figures indicate the number of credit hours a week. For details, see the descriptions of courses.]

FRESHMAN YEAR.

First Semester.

[All work required.]

English and public speaking, (With declamation, 5; without it, 4.)	5 or 4
French or German,[1]	4
Algebra,	5
Chemistry,	3
Hygiene,	1
Physical education,[2]	2
College life (attendance required without credit).	
	20 or 19

Second Semester.

[All work required.]

English and public speaking, (With declamation, 5; without it, 4.)	5 or 4
French or German,	4
Geometry and trigonometry,	5
Chemistry,	3
Elementary agriculture,	2
Physical education,	2
	21 or 20

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[1] Students may continue in college the language that they present for admission, or they may take the other; but they must continue whichever language they so elect until the end of the first semester of the sophomore year. Eleven college credits are required in this language.

[2] Physical education includes military training.

SOPHOMORE YEAR.

First Semester.

[All work required.]

English (proficient students may omit one hour),	2 or 1
French or German,	3
Agronomy,	3
Zoölogy,	3
Physics,	5
Physical education,	2
	18 or 17

Second Semester.

[All courses under "Required," with any two of those under "Elective."]

[Required.]

English (proficient students may omit one hour),	2 or 1
Elementary horticulture,	2
Botany,	4
Agricultural industry,	3
Physical education,	2
	13 or 12

[Elective.]

French or German, Animal husbandry, Geology, Physics, Chemistry, Surveying,	each 3 hours. Any two,	6
		19 or 18

JUNIOR AND SENIOR YEARS.

In the junior and in the senior year, work must be taken amounting to not fewer than seventeen nor more than twenty credits.

[Required.]

The following-named subjects are required after the sophomore year, as indicated: —

Physical education, two credits each semester of junior year,	4
Political science (Course 1, Economics),	3
English (any of the elective courses except Literature 15 and 16),	3

[Elective.]

Unless otherwise stated, elective courses are open to both juniors and seniors. Elections are subject to such provisions as the faculty may declare.

[Only those courses are here mentioned which are entirely elective; some courses that are open to election by part of the students but are required courses for others are omitted. For such courses, see under the respective department headings the descriptions of "Required Courses."]

Agricultural education, 1, 2, 3, 5, 6.
Agriculture: —
  Agriculture, 2.
  Agronomy, 1, 3, 4, 5, 6.
  Animal husbandry, 2, 3, 4, 5, 6.
  Dairying, 1, 2, 3, 4.
  Farm administration, 3, 4.
Botany, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14.
Chemistry, 4, 5, 6, 7, 9, 10, 11, 12, 14, 16.
Entomology, 2, 3, 4.
Horticulture: —
  Horticulture, 3, 4, 5, A.
  Pomology, 1, 2, 3, 4.
  Floriculture, 1, 2, 3, 4.
  Landscape gardening, 1, 2, 3, 4, 5, 6.
  Market gardening, 2, 3.
  Drawing, 1, 2.
Humanities: —
  English language, 7, 9, 10, 11, 13, 14, (15, 16).
  Literature, 7, 8, 9, 10, 11, 12, 14, 15, 16, 18.
  Public speaking, 3, 4.
  French, 6, 7, 8.
  Spanish, 1, 2.
  German, 6, 7, 8.
  Music, 1.
  Political science, 2, 4, 5, 7.
Mathematics, 7, 10; Physics, 6, 9, 15; Engineering, 8, 11, 12, 13, 14.
Military science, 7, 8.
Physical education, 7, 8, 9, 10.
Rural sociology: (agricultural economics) 4, 5, 7, 9, 10; (rural sociology) 12; (rural law) 14.
Veterinary science, 1, 3, 4.
Zoölogy and geology: —
  Zoölogy, 1, 3, 4, (5, 6, 7).
  Geology, 2.

B. UNDERGRADUATE COURSES.

[All courses given in the first semester bear odd numbers; all given in the second semester bear even numbers. Studies are pursued in courses, "course" implying the study given a subject within one semester, without regard to the total number of hours or to the number of credits. Under the heading "Required Courses" are classified all courses that are specifically required of any group of students, although in some cases the same courses are open to other students as electives. The special mention of certain courses as prerequisite to other courses does not imply that no courses but those so mentioned are "preliminary or preparatory" within the meaning of paragraph 9, page 9 of the Rules. Announcements of courses that are not given in 1909–10 are inclosed in brackets.]

Department of Agricultural Education.

Professor HART and Mr. JENKS.

Elective Courses.

1. MEANING OF EDUCATION (PSYCHOLOGY). — A study of the development, structure and function of the nervous system with reference to the sense organs; relation of mind to the nervous system; growth and nature of mental processes; the activities of the mind in the process of learning. Text-book, lectures, discussion, and collateral readings and reports; 3 hours. Credit, 3.
Professor HART.

2. VOCATIONAL EDUCATION (HISTORY AND PHILOSOPHY). — A survey of educational, religious and social movements with reference to their vocational aspects; the growth of educational institutions as influenced by science and industry. Lectures, collateral readings, reports, and a thesis on some phase of industrial education; 3 hours. Credit, 3. Professor HART.

3. METHODS. — A study of the subject-matter of agriculture that is appropriate for public schools; the relation of nature work to elementary agriculture; the school garden as a laboratory in connection with the science of biology; the relation of agricultural science to the other sciences. Prerequisite, Course 1 or 2; 2 hours. Credit, 2. Professor HART.

5. SEMINAR IN EDUCATION. — For students who have had courses 1, 2 and 3, or an equivalent. Topics that may be taken up for rather exhaustive study are: legislation and agricultural education, the place and value of agricultural science in school courses, etc. Seniors; open, subject to approval of the instructor, to other students; 2 hours. Credit, 2. Professor HART.

6. SEMINAR IN EDUCATION. — As stated under Course 5.
Professor HART.

Division of Agriculture.

Professor Foord, Dr. Brooks, Assistant Professor Lockwood, Mr. Haskell, Mr. Gribben.

Sections.

- Agronomy.
- Animal Husbandry.
- Dairying.
- Farm Administration.

[With the exception of the course in elementary agriculture, required in the second semester of the freshman year, the work in agriculture is distributed among four sections: Agronomy, Animal Husbandry, Dairying and Farm Administration.]

Agriculture.

Required Courses.

2. Elementary Agriculture. — A brief course touching upon the application of science to the common things of the farm. The work of the agricultural experiment stations and its relation to farm practice will be considered. Lectures, text-book and laboratory. Freshmen; 1 laboratory and 1 lecture period. Credit, 2.

Agronomy.

Required Courses.

1. Soils and Fertilizers. — A study of the formation, classification and physical and chemical properties of soils. This is followed by study of methods of soil improvement and of maintenance of fertility, including the use of farm manures, commercial fertilizers and soil amendments. In the laboratory, a study of the physical properties of soils is made, followed by laboratory and field exercises on the preparation and use of fertilizers. Prerequisite, Chemistry 1 and 2. Sophomores; 2 lectures and 1 laboratory period. Credit, 3. Mr. Haskell.

Elective Courses.

3. Field and Forage Crops. — History, classification, cultivation and harvesting, commercial grading and valuation. The crops studied are the cereal grains, grasses, legumes, forage crops, and those "money crops" of importance in New England. The laboratory work includes the testing of the purity and vitality of the seeds of the different field crops, valuation and judging thereof, and

study of the varieties suited to New England conditions. Prerequisites, Agronomy 1 and Botany 2; 2 lectures and 1 laboratory period. Credit, 3. Mr. HASKELL.

4. FIELD CROP IMPROVEMENT. — A study of the influences determining the yield and value of field crops, and of methods of selecting seed and plant with reference to crop improvement. Particular attention is given to the breeding of plants for early maturity, hardiness and disease resistance, so as to fit them to New England conditions. Lectures, laboratory and field work. Prerequisite, Agronomy 3; 1 lecture and 1 laboratory period. Credit, 2. Mr. HASKELL.

6. ADVANCED SOILS. — Theoretical and practical work on irrigation and drainage; soil survey, with the view of observing the relation between types of soil and its natural vegetation; soil mapping. Lectures, laboratory and library work; 2 lectures and 1 laboratory period. Credit, 3. Mr. HASKELL.

8. MANURES AND FERTILIZERS. — An advanced course, giving a general discussion of the different theories which have been held relative to the functions and importance of manures and fertilizers, and leading up to the views at present accepted. Each of the important manures and fertilizers will be discussed, its origin and its chemical and physical characteristics being considered. Each material taken up will be studied in relation to its capacity to supply plant food and to its effects upon soil texture, moisture, temperature and flora. Considerable attention will be devoted to consideration of the experimental work which has been done, and which is now in progress, in manures and fertilizers. Prerequisite, Agronomy 1; 3 lectures a week, with occasional seminars. Credit, 3. Dr. BROOKS.

Animal Husbandry.

Elective Courses.

2. TYPES AND BREEDS OF FARM ANIMALS. — A general introductory course. The development, characteristics and adaptability of the more common breeds of farm live stock. Lectures; Plumb's "Types and Breeds of Farm Animals." Sophomores; 2 lecture periods and 1 laboratory period. Credit, 3. Mr. GRIBBEN.

3. PRINCIPLES OF LIVE-STOCK IMPROVEMENT. — A careful study of the principles of inheritance, and a discussion of methods of im-

proving herds or individual animals, of crossing and grading in the production of market and farm stock. Prerequisite, Course 2; 3 lecture periods; library references. Credit, 3. Mr. Gribben.

4. Dairy Cattle. — Score cards as applied to breed type and their use in scoring for advanced registry; herd book study. One object is to acquaint the student with the various families of the different breeds, their producing powers and external characteristics. The men who will represent the college in judging contests will be chosen from those electing this course, according to the merit of their work. Text-book, lectures and laboratory work; text-book, Craig's "Live Stock Judging." Prerequisite, Course 2; 2 laboratory periods. Credit, 2. Mr. Gribben.

5. Horses, Sheep and Swine. — A course similar to Course 4, but dealing with different classes of stock. Of necessity, the study cannot be so detailed as that made in the preceding course, yet a good working knowledge of the judging of these classes is aimed at. The course will consist largely of judging practice, with some periods devoted to lectures, covering such topics as unsoundness in horses and the determination of age in domestic animals. Text-book, lectures and laboratory work. Craig's "Live Stock Judging." Prerequisite, Course 2; 2 laboratory periods. Credit, 2. Mr. Gribben.

6. Feeding and Management of Farm Live Stock. — The principles of nutrition; their relation to stock feeding; the balanced ration; feeding standards; feed stuffs, method of manufacture, economy to the feeder; economical feeding and management of farm animals; feeding for special purposes (as of dairy cows for records and in preparation for public sales or exhibitions). Text-books and lectures; text-books, Henry's "Feeds and Feeding" and Jordan's "Feeding Farm Animals;" experiment station bulletins. Students electing this course are advised to present Chemistry 5 and 6 and register in veterinary science; 3 hours. Credit, 3. Mr. Gribben.

Dairying.

Elective Courses.

1. Milk and its Composition. — The development of the dairy business in the United States; the composition, secretion and general characteristics of milk; contamination and fermentation; methods in economic milk production; methods for testing herds and

developing them to higher efficiency; the study of analysis of milk products by use of the Babcock test for fat, tests for acidity and adulteration, and ordinary preservatives; moisture tests for butter; problems. Must be preceded or accompanied by Animal Husbandry 3; 2 lecture hours and 1 laboratory period. Credit, 3.

Assistant Professor Lockwood.

2. Market Milk. — A study of the market milk conditions, extent and development of the business, supply and delivery; food value of milk and its use as food; milk and its relation to the public health; methods for the proper handling and preparing of milk and cream for direct consumption; certified milk, requirements and production; pasteurizing, sterilizing, standardizing and modifying; milk laws and inspection; a study of bacteriology relative to milk and dairy work. Must be preceded or accompanied by Animal Husbandry 4. Prerequisite, Course 1; 2 lecture hours and 1 laboratory period. Credit, 3. Assistant Professor Lockwood.

3. Butter Making. — A study of hand and factory separators, separator construction and cream separation; handling milk and cream for butter making on the farm and in the factory; preparation of home-made and commercial starters, and ripening cream; churning; recording work; markets and their requirements; marketing, scoring and judging butter; management; problems; dairy-building construction; plans for dairy buildings, arrangement, ventilation, light, sanitation; dairy machinery and care thereof; practical mechanics as applied to the creamery; cement construction as related to dairy construction work. Prerequisites, Courses 1 and 2; 2 lecture hours and 1 laboratory period. Credit, 3.

Assistant Professor Lockwood.

4. Manufactured Milk Products. — Manufacture of other dairy products than butter. Cheddar and fancy cheeses; condensed milks; whey butter, cottage cheese, ice cream, casein, milk powder, etc.; dairying in other countries; library work. Must be preceded or accompanied by Animal Husbandry 6. Prerequisites, Courses 1, 2 and 3; 2 lecture hours and 1 laboratory period. Credit, 3.

Assistant Professor Lockwood.

Farm Administration.

Elective Courses.

3. Farm Equipment. — A study of the material equipment of the farm aside from the land; farm buildings, their location, plan and arrangement; water supply; fencing problems; farm power; farm machinery; wagons. Prerequisite, Mathematics 5; 2 laboratory periods and 1 lecture hour. Credit, 3.

Professor Foord.

4. Farm Management. — The organization of the farm as a business enterprise. A discussion and study of some of the problems that confront the modern farmer, such as the choice of a farm, systems and types of farming, labor, marketing, records and farm accounts. Prerequisites, Agronomy 1 and 3 and Animal Husbandry 2; 2 lecture or recitation hours and 1 seminar period. Credit, 3.

Professor Foord.

Department of Botany.

Professor Stone, Assistant Professor Osmun, Mr. Jennison.

[The object of the courses in botany is to teach those topics pertaining to the science which have a bearing upon economic and scientific agriculture. Undergraduate work extending through five semesters is offered. Considerable latitude is allowed students in the senior year in their electives; and, besides the courses here outlined, students often take up the study of histology or of systematic botany, the microscopic examination of pure and adulterated human and cattle foods, spices and drugs, etc. Students sufficiently prepared are occasionally permitted to undertake special physiological and pathological investigations. A botanical conference is held monthly wherein new problems in botanical science are considered by graduate students and the seniors who elect botany.]

Required Courses.

2. Histology, Physiology, Morphology and Classification of Plants. — This course is divided into two parts: Part I. extends to the first week in May; Part II. occupies the remainder of the semester. Part I.: Devoted to study of the minute structure and the function of stems, leaves, roots and seeds, and of the chemical composition of plant constituents. The laboratory work consists largely of microscopic study of plant structures, with some time devoted to chemical tests for plant constituents. The lectures aim to amplify and interpret the laboratory work, and to explain the inter-relation of structure and function. Part II.: The laboratory periods are employed in the study of morphology and plant analy-

sis. Lectures are given in morphology, ecology, evolution and taxonomy. Each student is required to collect and prepare an herbarium of 75 species of native plants. Gray's "New Manual of Botany" is used in determining and naming plants. Though only one lecture period is scheduled for this course, it is understood that laboratory hours may be used for lectures at the discretion of the instructor. Sophomores; three 2-hour laboratory periods and 1 lecture hour. Credit, 4.

Assistant Professor OSMUN and Mr. JENNISON.

Elective Courses.[1]

3. CRYPTOGAMIC BOTANY. — Systematic study of typical forms of the lower plants (bacteria, algæ, fungi, lichens, mosses and ferns); instruction in laboratory technique and methods, and the making of herbaria of lichens, mosses and ferns. Laboratory work and lectures; field excursions for the purpose of observing environmental habits and collecting material for laboratory study; collateral reading. This course is intended for those students who wish to specialize in biology; its purpose is to afford more thorough scientific training than is offered in Course 5, and students electing this course will attend the lectures in Course 5. Juniors; three 2-hour laboratory periods and 1 lecture hour. Credit, 4.

Assistant Professor OSMUN.

4. CRYPTOGAMIC BOTANY. — This is a continuation of Course 3. Prerequisite, Course 3. Juniors; one 2-hour laboratory period and 1 lecture hour. Credit, 2. Assistant Professor OSMUN.

5. PLANT PATHOLOGY. — This course comprises a study of the common diseases of crops and consideration of the methods for their prevention and control, and is intended especially for students in horticulture and agriculture. Laboratory work and lectures. The work in pathology is preceded by a brief study of the lower cryptogams. Juniors; one 2-hour laboratory and one 1-hour lecture period. Credit, 2.

Professor STONE, Assistant Professor OSMUN and Mr. JENNISON.

7. PLANT PATHOLOGY. — This course includes a study of the diseases of one or more crops and the methods of controlling them. Laboratory work and lectures, together with extensive reading of

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[1] Students electing any of the junior work may take botany in their senior year, and those specializing in chemistry may take plant physiology in their senior year without having had the junior work in botany.

experiment station literature. The course is intended for those who wish to become more familiar with the diseases of one or more groups of economic plants. Seniors; those students continuing in botany must take Course 8; three 3-hour laboratory periods and 1 lecture period. Credit, 5. Professor STONE.

8. PLANT PATHOLOGY. — As stated in Course 7. Prerequisite, Course 7. Professor STONE.

9. ECONOMIC FUNGI. — This course comprises the study of economic fungi from a taxonomic point of view, and is intended for those who wish a more comprehensive knowledge of the phylogenetic relationships of fungi. Laboratory work and lectures. Tubeuf & Smith's "Diseases of Plants" is used as a guide, with special monographs on fungi and with the more important experiment station literature treating of the life history of fungi. Seniors; must be followed by Course 10; two or three 3-hour laboratory periods and one 1-hour lecture period. Credit, 4 or 5. Professor STONE.

10. ECONOMIC FUNGI. — As stated in Course 9. Prerequisite, Course 9. Professor STONE.

11. PLANT PHYSIOLOGY. — This course is largely experimental, and is especially adapted to the needs of students who are taking chemistry. Laboratory work and lectures; various handbooks on plant physiology. Seniors; must be followed by Course 12; three 3-hour laboratory periods and one 1-hour lecture period. Credit, 5. Professor STONE.

12. PLANT PHYSIOLOGY. — As stated in Course 11. Prerequisite, Course 11. Professor STONE.

13. PHYSIOLOGY AND PATHOLOGY OF SHADE TREES. — This course includes a comprehensive study of the diseases, structure and functions of trees and shrubs, and of every agency which in any way affects shade trees. Laboratory work and lectures; extensive reference reading. Designed for those students who intend to take charge of parks or large estates, or to become tree wardens, city foresters, landscape gardeners or professional advisers and caretakers. Seniors; must be followed by Course 14; two 3-hour laboratory periods and one 1-hour lecture period. Credit, 4. Professor STONE.

14. Physiology and Pathology of Shade Trees. — As stated in Course 13. Prerequisite, Course 13. Professor Stone.

Department of General and Agricultural Chemistry.

Professor Wellington, Assistant Professor Howard, Dr. Maclaurin, Mr. Fowler, Mr. Shaw.

[The courses in chemistry aim to teach accurate observation, logical thinking and systematic and constant industry, together with a comprehensive knowledge of the subjects presented. Instruction is given through text-books, lectures and a large amount of laboratory work under supervision. The laboratory work at first consists of the study of the properties of elementary matter, the analysis of simple combinations, and their artificial preparation. This is followed by the quantitative analysis of salts, minerals, soils, fertilizers and the chemistry of various manufacturing industries, especially those of agricultural interest, such as are concerned in the production of sugar, starch and dairy products; the preparation of animal and plant foods, their digestion, assimilation and economic use; and the official analysis of soils, insecticides, fungicides, waters, milk, wine, and other animal and vegetable products.]

Required Courses.

1. The Non-metals. — An introduction to chemical laws. The commoner non-metallic elements, their occurrence in nature, and their uses in the arts, are studied. Lectures and laboratory exercises; Alex. Smith's "General Inorganic Chemistry." Freshmen; 4 hours. Credit, 3. Assistant Professor Howard.

2. The Common Metals. — This course extends the study of Course 1 to the metals common in the arts, and includes blowpipe analysis and elementary determinative mineralogy. Lectures, recitations and laboratory exercises. Prerequisite, Course 1. Freshmen; 4 hours. Credit, 3. Assistant Professor Howard.

Elective Courses.

4. Qualitative and Quantitative Analysis. — A two-part course for students who wish to become acquainted with only a limited field of analysis. Lectures and laboratory work; Treadwell-Hall's "Analytical Chemistry." Prerequisite, Course 2; sophomores; 6 hours. Credit, 3. ————————

5. Organic Chemistry. — A systematic study of the origin and relationships of carbon compounds, particularly those occurring in plants and animals. Prerequisite, Course 4. Juniors; lectures 3 hours, laboratory 2 hours. Credit, 4. Dr. Maclaurin.

6. Chemistry of Plant and Animal Life. — In this course the commoner chemical reactions in plant and animal bodies are

studied. The ordinary processes of digestion, assimilation, secretion and excretion are examined in detail. Prerequisite, Course 5. Juniors; lectures 3 hours, laboratory 2 hours. Credit, 4.

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7. CHEMISTRY OF PLANT AND ANIMAL LIFE. — This course takes up the study of physiological chemical processes beyond the scope of Course 6, and is open only to students who have attained marked proficiency in that course. By arrangement. Credit, 5.

Mr. SHAW.

9. ADVANCED ANALYSIS. — For those who wish to acquire skill in chemical analysis. Students intending to enter experiment-station or chemical-control work have here an opportunity to become familiar with the processes concerned. Prerequisite, Course 5. Seniors; lectures 1 hour, laboratory 9 hours. Credit, 5.

Professor WELLINGTON.

10. ADVANCED ANALYSIS. — As stated under Course 9. Prerequisite, Course 9. Credit, 5.

Professor WELLINGTON.

11. PHYSICAL CHEMISTRY. — Prerequisites, Courses 4 and 5. Seniors; lectures 2 hours. Credit, 2.

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12. ANALYSIS OF FOODS AND FODDERS. — Prerequisite, Course 5. Seniors; lectures 1 hour, laboratory 9 hours. Credit, 5.

Mr. FOWLER.

14. ANALYSIS OF FERTILIZERS, INSECTICIDES AND FUNGICIDES. — Prerequisite, Course 4. Seniors; lectures 1 hour, laboratory 9 hours. Credit, 5.

Professor WELLINGTON.

16. CHEMISTRY OF SUGAR MAKING AND REFINING. — Prerequisite, Course 5. Seniors; lectures 1 hour, laboratory 9 hours. Credit, 5.

Professor WELLINGTON.

Department of Entomology.

Prof. C. H. Fernald, Prof. H. T. Fernald, Mr. Summers.

[A knowledge of insects is of importance in every department of life, and particularly in connection with agriculture, horticulture, biology, landscape gardening and forestry; it therefore forms part of a general education. An introductory course in this subject is accordingly offered in the junior year. For those who desire a further knowledge of the subject, because of its importance to their future occupation, a senior course is also offered, so arranged as to be of especial value for those who expect to take up agriculture, horticulture, landscape gardening, forestry or science teaching.]

Elective Courses.

2. General and Economic Entomology. — This course comprises studies in the structure of insects as applied to their identification, and in the principles of classification; a systematic examination of the different groups and of the most important economic insects of each group, including their life histories and habits, recognition of their work as shown in the collection and in the field, and methods for their control. The most important insecticides, and their preparation and application with different kinds of apparatus, are also treated. Field work in collecting insects is a part of the course; and this is accompanied by laboratory work on methods of pinning, pressing and mounting insects, and of classifying them. Juniors; four 1-hour lecture periods till about May 1; thereafter one 1-hour lecture period and three 2-hour laboratory or field periods. Credit, 4. Prof. H. T. Fernald.

3. Advanced Entomology. — This course is subdivided according to the particular needs of those taking it, and is to a large degree given in the form of individual instruction.

A. Morphology. — Careful studies of the structure of insects belonging to each of the larger and more important orders, together with lectures on the subject, followed by the identification of insects of each of these groups and the study of the collections, to teach the use of the analytical tables and of structural characters in the determination of insects.

B. Histology. — Lectures on the internal anatomy and the histology of the various organs, with particular reference to those affected by the various insecticides.

C. Insecticides and Apparatus. — Lectures on the chemistry, preparation and application of the different insecticides, their merits and defects, tests for detecting adulterations; and a study of other methods of insect control, together with laboratory work on adulterated materials.

D. Coccidology. — Laboratory work on methods of preserving, mounting and identifying scale insects, particular attention being given to those of greatest economic importance.

E. Bibliography. — Studies of the various sources of entomological publications and of the methods of finding the literature on any insect.

F. Special Studies. — In these studies the insects most closely related to the future occupation of the student will receive attention.

The results of these studies are brought together in the form of an essay or thesis; this will include all the essentials of what is known of the structure, life history, habits and injuries caused by each insect studied, together with methods of treatment, and a list of the best articles found in the course of the work. Comstock's "Manual for the Study of Insects" is used in the laboratory work. Seniors; prerequisite, Entomology 2; students electing 3 must also take 4; one 1-hour lecture period and three 2-hour laboratory or field periods. Credit, 4.

Profs. C. H. FERNALD and H. T. FERNALD and Mr. SUMMERS.

4. ADVANCED ENTOMOLOGY. — As stated in Course 3. Prerequisite, Course 3.

Profs. C. H. FERNALD and H. T. FERNALD and Mr. SUMMERS.

DIVISION OF HORTICULTURE.

Professor WAUGH, Professor SEARS, Assistant Professor WHITE, Mr. TOMPSON, Mr. RANE, Mr. GRACEY.

DEPARTMENTS.

Horticulture.
Pomology.
Floriculture.
Landscape Gardening.
Market Gardening (Section).
Drawing (Section).

Department of Horticulture.

[The general subject of horticulture divides naturally into the subjects of pomology, floriculture, landscape gardening and market gardening. A number of courses relate to more than one of these subjects, and are therefore here grouped under the general designation of Horticulture.]

Required Courses.

2. NURSERY PRACTICE. — This course treats of the fundamental operations of horticulture — propagation, pruning, cultivation —

as related to the physiology of the plant. Lectures and practicums; Bailey's "Nursery Book" as text in propagation. Sophomores; 2 hours. Credit, 2. Professor SEARS.

Elective Courses.

3. ARBORICULTURE. — This course aims to make the students familiar with the character of the trees, shrubs and herbaceous perennials used in ornamental work, and with the methods of propagating them. Prerequisite, Horticulture 2. Juniors; 2 lecture periods and 1 laboratory period. Credit, 3.
Assistant Professor WHITE.

4. PLANT BREEDING. — This course is designed to introduce advanced students to the best modern views of variation, heredity and evolution, and to the best methods of studying the phenomena found in these subjects. The principles educed apply to both animal breeding and plant breeding, but the laboratory work (of which there is considerable) is concerned chiefly with plant life. Some practice work in hybridization and selection is undertaken, and students are trained as far as possible in the practical application of those principles which have direct bearing on the breeding of plants and the cultivation of crops. Seniors and graduates; open only to students well prepared in agricultural or horticultural subjects; 2 lecture periods and one 2-hour laboratory period. Credit, 3.
Professor WAUGH.

5. THE LITERATURE OF HORTICULTURE. — A broad seminar course, with extended readings, covering the entire field of horticulture. Typical modern works are first studied, including representative authors and the leading publishers. Consideration is given to books, periodicals and bulletins of all kinds, with a view to securing a comprehensive view and a working knowledge. Study and reference methods are given special attention. After a good command of current literature is secured, older works are taken up and the forces and direction of development are pointed out. A special study is made of the old herbals. Finally, the relation of horticultural literature to horticultural practice is summarily sketched. Graduates and undergraduates. Credit, 2.
Professor WAUGH.

A. Forestry. — A short course of lectures and field exercises, to introduce students to the general principles of forestry management, including nursery work, sylviculture, forest mensuration and exploitation, with special reference to the management of farm woodlots. This course is given annually by special arrangement with the State Forester of Massachusetts.[1] Mr. Rane.

Department of Pomology.

Elective Courses.

1. Practical Pomology. — *General.* — A study of the general principles of the growing of fruits, dealing with such questions as selection of site, soils, windbreaks, laying out plantations, choice of stock, pruning, spraying, etc. Text and reference books; field and laboratory exercises. Prerequisite, Horticulture 2. Juniors; 5 hours. Credit, 3. Professor Sears.

2. Practical Pomology. — *Special.* — The special application of the general principles discussed in Course 1 to the culture of the principal kinds of fruits, such as apples, pears, peaches, plums, cherries and quinces; grape culture and the culture of small fruits, such as blackberries, raspberries, currants, gooseberries and strawberries. Text-books, lectures and reference books; field and laboratory exercises. Prerequisites, Horticulture 2 and Pomology 1. Juniors; 5 hours. Credit, 3. Professor Sears.

3. Systematic Pomology. — A study of the varieties of the different fruits and of nomenclature and the identification of varieties, with critical descriptions and special reference to relationships and classifications. Text-books, laboratory and field exercises. Prerequisites, Horticulture 2 and Pomology 1 and 2. Seniors; 5 hours. Credit, 3. Professor Sears.

4. Commercial Pomology. — The storing and marketing of fruits; includes a discussion of storage houses, the handling and storing of fruits, fruit packages, methods of grading and packing, etc. Text and reference books; laboratory exercises. Seniors; prerequisites, Horticulture 2, Pomology 1, 2 and 3; 5 hours. Credit, 3. Professor Sears.

Department of Floriculture.

Elective Courses.

1. Greenhouse Management. — This course is designed to familiarize students with methods followed in the management of greenhouse crops. The students are instructed in the practical

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[1] Additional courses in forestry for the year 1909–10 will be announced soon.

operation of greenhouse watering, fumigating and ventilating, in the care of furnaces, and in the methods of propagation of greenhouse plants by seeds, cuttings, budding and grafting. This is designed as a laboratory course, and students electing it will be expected to arrange their hours according to the needs of the work. Prerequisite, Horticulture 2. Juniors; 7 hours a week. Credit, 3. Assistant Professor WHITE.

2. GREENHOUSE DESIGN AND CONSTRUCTION. — A study of the location, arrangement and construction of greenhouses; the drawing of plans for commercial and private ranges, to show foundations and details in construction of superstructure; arrangement of heating pipes; estimates of comparative cost of different methods of construction; drafting specifications. Juniors; prerequisites, Floriculture 1; 5 hours. Credit, 3.
Assistant Professor WHITE.

3. FALL GREENHOUSE CROPS. — A study of important fall and winter crops and their care, — chrysanthemums, carnations, violets, roses, palms, and the like; the importation, purchase and growth of bulbous material; the preparation of material for forcing; design making; house and church decorating. Lectures, text-books and laboratory exercises. Prerequisites, Floriculture 1 and 2. Seniors; 5 hours. Credit, 3. Assistant Professor WHITE.

4. SPRING GREENHOUSE CROPS. — The culture of individual crops in their relation to spring work in a florist establishment. A critical study of methods of propagating bedding plants, the nature and use of these plants, practice in planting them and in the spring care of herbaceous perennials and wholesale and retail marketing of spring plants. Lectures, text-books and practical exercises. Seniors; prerequisite, Floriculture 1, 2 and 3; 5 hours. Credit, 3.
Assistant Professor WHITE.

Department of Landscape Gardening.

Elective Courses.

1. ELEMENTS OF LANDSCAPE GARDENING. — Reconnoissance surveys and mapping; detailed study of selected works of leading landscape gardeners; grade design, road design and field work. Students should have preparation in surveying, mathematics, arboriculture and drawing. Must be followed by Course 2. Juniors; 7 hours a week. Credit, 4. Professor WAUGH and Mr. GRACEY.

2. Elements of Landscape Gardening. — As stated under Course 1. Prerequisite, Course 1.
Professor Waugh and Mr. Gracey.

3. General Landscape Gardening. — Field notes; examination of completed works and those under construction; design of architectural details; planting plans; estimates; written reports of individual problems. Seniors; prerequisites, Landscape Gardening 1 and 2, and either arboriculture (Horticulture 3) or advanced mathematics; must be followed by Course 4; 7 hours. Credit, 4.
Professor Waugh.

4. General Landscape Gardening. — As stated under Course 3. Prerequisite, Course 3. Professor Waugh.

5. Theory of Landscape Art. — The general theory and applications of landscape study, including a brief history of the art. Seniors and graduates; 2 hours. Credit, 2.
Professor Waugh.

6. Ornamental Gardening. — An elementary course for students who take no other work in landscape gardening. The general principles and their simpler applications, such as the ornamental planting of farm yards, school grounds and streets, the care of estates, etc. Text-book, Waugh's "Landscape Gardening." 3 hours. Credit, 3. Mr. Gracey.

Market Gardening.

Elective Courses.

2. Elements of Market Gardening. — This course consists of a study of the elements and fundamental problems of market gardening, with careful study of such subjects as garden soils, garden fertilizers and systems of planting and cultivation. The principal garden crops are studied. Lectures and practical exercises. Juniors; prerequisite, Horticulture 1; 3 hours. Credit, 3.
Mr. Tompson.

3. Advanced Market Gardening. — A continuation of the work begun in Market Gardening 2, taking up problems of harvesting, storing and marketing. Considerable time is devoted to growing vegetables under glass, and special and novel vegetable

crops are studied. Careful note-taking and considerable collateral reading are required. Floriculture 1 must be taken in connection with this course. Seniors: prerequisite, Market Gardening 2; 5 hours. Credit, 3. Mr. Tompson.

Drawing.

Elective Courses.

[1. Freehand Drawing. — Lettering; sketching from type models, leaves, fruits, vegetables, flowers and trees, insects and small animals; laying flat and graded washes in water colors; water-color rendering of fruits, vegetables, leaves, flowers and trees; topographical lettering and conventional signs in ink; conventional coloring; mapping in ink and in water colors. Not given in 1909–10. Juniors; 6 hours. Credit, 3. Mr. Gracey.]

2. Mechanical Drawing. — Inking exercises; geometric problems; projection; intersections; isometric; shades and shadows; parallel; angular and oblique perspective; perspective drawing of buildings. Juniors; 6 hours. Credit, 3. Mr. Gracey.

Division of the Humanities.

Professor Mills, Assistant Professor Neal, Assistant Professor Holcomb, Mr. Mackimmie, Mr. Ashley, Mr. Green.

Departments.

English.
Modern European Languages.
Music (Section).
Political Science.
Library.

Department of English.

English Language.
Literature.
Public Speaking.

[Enrolment in the elective courses in the Department of English is subject to the approval of the instructor. The membership in several of the courses is strictly limited; hence students are advised to plan their work well in advance in order to be sure of completing the required three hours of post-sophomore English. This credit must be made up without taking Literature 15 or 16. In each semester, the students enrolled in elective courses in English are expected to take part in the meetings of the English Conference, which consists of the instructors and students in the Department of English. The meetings of the Conference are held once every four weeks, or oftener, between October 1 and June 7.]

ENGLISH LANGUAGE.

Required Courses.

1. FRESHMAN ENGLISH. — Composition; introduction to literature. Recitations and lectures; theme writing; conferences[1] weekly or fortnightly; declamation at option of instructor. Freshmen; 5 hours. Credit, not including declamation, 4; including declamation, 5. The DEPARTMENT.

2. FRESHMAN ENGLISH. — As stated under Course 1. Prerequisite, Course 1. The DEPARTMENT.

3A and 3. SOPHOMORE ENGLISH. — Composition; literature. These courses supplement Courses 1 and 2, and add instruction in the use of the library. Course 3 open only to sophomores whose work in Courses 1 and 2 reaches a standard satisfactory to the department; Course 3A required of all others. Prerequisite, Course 2; sophomores; 2 hours for 3A, 1 hour for 3. Credit, 2 and 1 respectively. The DEPARTMENT and Mr. GREEN.

4A and 4. SOPHOMORE ENGLISH. — As stated under Courses 3A–3, which are respectively prerequisite to these courses.
The DEPARTMENT and Mr. GREEN.

5. TRAINING COURSE. — A special course that follows and enlarges upon the study outline of Courses 1 and 2. Required of the readers in English; open, with approval of instructor, to candidates for appointment as readers, and therefore may be taken with full credit by approved sophomore students in place of English 3 and 4. One hour, with a second hour at the option of the instructor. Credit, 2. The DEPARTMENT.

6. TRAINING COURSE. — As outlined under Course 5.
The DEPARTMENT.

Elective Courses.

[7. ADVANCED COMPOSITION. — A course varying in plan, but usually concerned with some form of exposition, description or narration. In 1908–09, it dealt mainly with narration and character portrayal. Lectures or text-book assignments; studies of types; exercises; long papers. Given every other year; not given in 1909–10. Two hours, with a third hour at the option of the instructor. Credit, 2. Assistant Professor NEAL.]

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[1] Student theme-readers for 1908–09: Herbert Linwood White, '09; Josiah Chase Folsom, '10; Samuel Weis Mendum, '10; George Murray Brown, Jr., '09 (first semester); Charles Howard White, '09 (first semester); Henry Alvan Brooks, '10 (second semester); Edward Harrison Turner, '10 (second semester).

9. AGRICULTURAL JOURNALISM. — Lectures as in Course 11, and the production of "copy" adapted to the use of agricultural periodicals. The class, organized as an editorial staff, is charged with the publication of an agricultural periodical (see Course 11). This periodical is submitted for discussion to the Stockbridge Club. The instructors in the agricultural subjects criticise the substance of the articles; the instructor in the course criticises style and "make-up." Given every other year; to be given in 1909–10. Students enrolling must, to secure credit, also take Course 10. One hour, with a second hour at the option of the instructor. Credit, 1.
Assistant Professor NEAL.

10. AGRICULTURAL JOURNALISM. — As stated under Course 9. Prerequisite, Course 9. Assistant Professor NEAL.

11. PERIODICAL WRITING. — Lectures on the elements of journalism — newspaper and magazine writing, reporting, editing, printing, etc. — and the production of "copy" under conditions as nearly as possible like those under which newspaper and magazine writing is carried on. The class, organized as an editorial staff, is to issue a periodical. It is responsible for "covering" events; determining the subjects to be treated and the manner of treatment; accepting and rejecting articles; desk editing, copy and proof reading; making "dummies" and writing legends for illustrations; completing "forms" and "publishing" the periodical upon schedule time, etc. Given every other year; to be given in 1909–10. Two hours, with a third hour at the option of the instructor. Credit, 2. Assistant Professor NEAL.

[13. PROSEMINAR IN JOURNALISM. — Informal, beginning with a study by individual students of editorial writing and of types of magazine writing, such as "descriptive" articles, research articles, "human interest" articles, and articles in "popularized" science. Members of the class are expected to formulate through these studies theories of journalism and journalistic writing, to state them in thesis form and to produce articles of the kinds studied. Reference reading and reports upon current periodicals may be

called for. Prerequisite, either Course 11 or Courses 9 and 10. Given every other year; not given in 1909–10. One hour, with a second hour at the option of the instructor. Credit, 1.
Assistant Professor NEAL.]

[14. PROSEMINAR IN JOURNALISM. — As stated under Course 11.
Assistant Professor NEAL.]

15. ENGLISH LANGUAGE. — See Literature 15.
16. ENGLISH LANGUAGE. — See Literature 16.

LITERATURE.

Required Courses.

1, 2, 3A, 3, 4A, 4, 5 and 6. — See the courses so numbered under English Language.

Elective Courses.

7. INDIVIDUAL READING. — Cultural reading courses. Students must, when enrolling, present in writing a detailed statement of the reading they purpose to do. The reading must be sufficient to require forty-five hours; must be strictly non-technical; may be in any subject; and may be taken in any department by arrangement between the student and the instructor in the department concerned. If the reading be taken outside the Department of English, the student must, before presenting his outline of reading, secure in writing the endorsement thereof by the instructor under whom he is to read. Each student must prepare a two thousand word thesis upon his reading, and this thesis must be presented by the fourth Wednesday before the beginning of senior examinations. It must be accompanied with a written statement from the supervising instructor that the reading as outlined has been satisfactorily completed, and that the thesis is satisfactory in subject-matter. Prerequisite, the sophomore courses in English; total credits allowed on Courses 7 and 8 in any two years, 2. Credit, 1.
The DEPARTMENT.

8. INDIVIDUAL READING. — As stated under Course 7.
The DEPARTMENT.

9. ELIZABETHAN LITERATURE (1557–1637). — Lectures, textbook or reference assignments, or class-room interpretation of authors; much outside reading; written studies upon announce-

ment. Not given in 1910–11. Prerequisite, the sophomore courses in English. Two hours, with a third hour at the option of the instructor. Credit, 2. Assistant Professor NEAL.

10. PURITAN AND RESTORATION LITERATURE (1616–1700). — The same in plan, requirements and hours as Course 9. Not given in 1910–11. Assistant Professor NEAL.

[11. EARLY EIGHTEENTH CENTURY LITERATURE (1700–1740).[1] — The same in plan, requirements and hours as Course 9. Not given in 1909–10; given in 1910–11.
Assistant Professor NEAL.]

[12. MIDDLE EIGHTEENTH CENTURY LITERATURE (1740–1780).[1] — The same in plan, requirements and hours as Course 9. Not given in 1909–10; given in 1910–11.
Assistant Professor NEAL.]

[13. TRANSITION EIGHTEENTH–NINETEENTH CENTURY LITERATURE (1780–1815).[1] — The same in plan, requirements and hours as Course 9. Not given in 1909–10; given in 1911–12.
Assistant Professor NEAL.]

[14. EARLY NINETEENTH CENTURY LITERATURE (1800–1832).[1] — The same in plan, requirements and hours as Course 9. Not given in 1909–10; given in 1911–12.
Assistant Professor NEAL.]

18. ADVANCED LITERARY STUDY. — This course varies from year to year. It will usually provide opportunity either for intensive study of great writers or for study of the historical development or the structure and characteristics of literary types. Prerequisite, the sophomore courses in English; but those students who have taken or are taking courses in literary history or general reading will be the better prepared to take Course 18 with profit. In 1909–10, Shakspere; in 1910–11, the English novel. — Shakspere: The interpretation of two plays in class and the reading of three others outside; the life of Shakspere; collateral reading. Tests and examinations. Two hours, with a third hour at the option of the instructor. Credit, 2. Assistant Professor NEAL.

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[1] In 1908–09, Courses 11–14 were given as a single course, open to juniors only.

15. English Language and Literature. — The origin, history and development of the English language; essayists and novelists of the nineteenth century. Continuous with Course 16. Seniors; 3 hours. Credit, 3. Professor Mills.

16. English Language and Literature. — Continuous with Course 15. The elements of literary criticism; nineteenth century poets. Seniors; 3 hours. Credit, 3. Professor Mills.

Public Speaking.

Required Courses.

1. Declamation. — Freshman course, included under Courses 1 and 2 in English Language. A credit amounting to 1 hour for one semester is given in Courses 1 and 2 together.

2. Declamation. — As in Course 1.

Elective Courses.

3. Oration. — Announcement to be made.

4. Argumentation and Debate. — Announcement to be made.

Department of Modern European Languages.

French.

Required Courses.

1. Elementary French. — A beginning course. Frazer & Squair's "French Grammar;" reader; graduated texts. Required of freshmen presenting German for entrance who do not continue that language and have not studied French; open upon arrangement to other students. Freshmen; 4 hours. Credit, 4. Mr. Mackimmie.

2. Elementary French. — As stated under Course 1. Prerequisite, Course 1. Mr. Mackimmie.

A1. Second-year French. — Elementary and easy sight reading; grammar, Frazer & Squair's "Grammar," part II.; composi-

tion and reports. Intended for those freshmen who enter in 1909 under the old requirements with only one year of French; not to be given after 1909–10. Freshmen; 4 hours. Credit, 4.
Mr. Mackimmie.

A2. Second-year French. — As stated under Course A1. Prerequisite, Course A1. Mr. Mackimmie.

3. Intermediate French (third year). — Training for rapid reading; the reading of a number of standard novels and plays; composition; reports on collateral reading from periodicals and scientific texts in the library. Required of freshmen who present two years of French for entrance and do not take German, and of sophomores who take Courses 1 and 2 as freshmen; open upon arrangement to other students; 4 hours. Credit, 4.
Mr. Mackimmie.

4. Intermediate French. — As stated under Course 3, but not required of sophomores who take Courses 1 and 2 as freshmen. Prerequisite, Course 3. Mr. Mackimmie.

5. Advanced French (fourth year). — A reading course; representative masterpieces of the nineteenth century; collateral reading and written reports. Required of sophomores who take Courses 3 and 4 as freshmen; open upon arrangement to other students. Prerequisite, Course 4; 3 hours. Credit, 3.
Mr. Mackimmie.

Elective Courses.

6. Advanced French (fourth year). — A general view of the history of French literature. Several plays of the great classical dramatist will be read. Prerequisite, Course 5. Sophomores; open upon arrangement to other students; 3 hours. Credit, 3.
Mr. Mackimmie.

7 and 8. French Language or Literature (fourth year). — Courses in more advanced subjects; to be announced; 3 hours. Credit, 3. Mr. Mackimmie.

SPANISH.

Elective Courses.

1. Elementary Spanish. — Grammar, with special drill in pronunciation; reading from a simple reader. Seniors; open upon arrangement to other students; 4 hours. Credit, 4.
Mr. Mackimmie.

2. Modern Spanish Authors. — Reading from modern Spanish novel and drama. Prerequisite, Course 1. Seniors; open upon arrangement to other students; 4 hours. Credit, 4.
Mr. Mackimmie.

German.

Required Courses.

1. Elementary German. — Grammar and composition; the reading of short stories, poems, plays, etc. Required of those presenting French for entrance who do not continue that language and have not studied German. Freshmen; open upon arrangement to other students; 4 hours. Credit, 4. Mr. Ashley.

2. Elementary German. — As stated under Course 1. Prerequisite, Course 1. Mr. Ashley.

3. Intermediate German. — Rapid reading of selected works from Schiller, Goethe, Lessing and others; review of grammar; outside readings. Required of freshmen who present German for entrance and do not take French, and of sophomores who took Courses 1 and 2 as freshmen. Freshmen and sophomores; open upon arrangement to other students; 4 hours. Credit, 4.
Mr. Ashley.

4. Intermediate German. — As stated under Course 3, but not required of sophomores who took Courses 1 and 2 as freshmen. Prerequisite, Course 3. Mr. Ashley.

5. Advanced German. — The rapid reading of selections from the best authors (novels and dramas); outside reading in German periodicals of selected articles concerning various subjects and designed to promote research and reference work. Prerequisite, Course 4. Sophomores; required of those who took German 3 and 4 as freshmen; open upon arrangement to other students; 3 hours. Credit, 3. Mr. Ashley.

Elective Courses.

6. Advanced German. — As stated under Course 5; sophomores; open upon arrangement to other students. Prerequisite, Course 5; 3 hours. Credit, 3. Mr. Ashley.

7. Readings and Investigations. — The reading of novels and journals; presentation by members of class of reports on period-

ical articles; reports upon assigned reference work in encyclopedias; 3 hours. Credit, 3. Mr. Ashley.

8. Readings and Investigations. — As stated under Course 7. Mr. Ashley.

Music.

Elective Courses.

1. History and Interpretation of Music. — The lives and works of famous composers from Händel to Grieg, with exposition on the pianoforte of representative works; text-book; 1 hour. Credit, 1. Mr. Ashley.

Department of Political Science.

Required Courses.

1. Economics. — Text-books and assigned reading. For reference reading the class is divided into six groups, each student being allowed to choose any one of six subjects of investigation, according to his tastes and probable future career. The class is acquainted with the substance of the reading assigned to each group by means of weekly papers read by members of the respective groups. Must be taken as a prerequisite to graduation; 3 hours. Credit, 3. Assistant Professor Holcomb.

Elective Courses.

2. Government. — The local, State and federal governments of the United States, and the constitutional history of Massachusetts; features of local government peculiar to Massachusetts or to New England; lectures on the history of political parties. Emphasis is laid on the period beginning with the close of the civil war. Text-books and lectures; 3 hours. Credit, 3. Assistant Professor Holcomb.

4. Economic History. — The economic history of England to the reign of Henry VIII.; the history of England and the American colonies in conjunction to 1783; and thereafter the history of England and of the United States. Emphasis is laid on economic history, but the more important political and religious movements are treated in their economic relations. Text-books, lectures and assigned reading; 3 hours. Credit, 3. Assistant Professor Holcomb.

5. The History of New England. — In this course, New England is regarded as a unit. Although the history of agriculture and rural life is treated with special fullness, ample attention is given to political, religious and ethical history. It is hoped that the student will not only be led to an intelligent understanding of present economic conditions, but will also be imbued with a progressive loyalty to the highest ideals of the New England of the past. Lectures and required reading. Given every other year; given in 1909–10; 3 hours. Credit, 3. Assistant Professor Holcomb.

[7. The History of Ideals. — This course is intended to supplement Course 4, treating history from the idealistic, rather than from the economic, point of view. It attempts to define the great ideals which have impelled the most important social, political, esthetic, ethical and religious movements of medieval and modern history, and to trace the causes of the success or failure of the movements to which these ideals have led. The ideals of Christianity, including monasticism, modern Catholicism and Protestantism; of medieval art and architecture; of political and social democracy, including universal suffrage, the abolition of slavery, modern socialism and social reform — may be taken as examples. Lectures and required reading. Although Course 4 is not a prerequisite to this course, students should take both. Given every other year; not offered in 1909–10; 3 hours. Credit, 3.

Assistant Professor Holcomb.]

Department of Mathematics, Physics and Civil Engineering.

Professor Ostrander, Associate Professor Hasbrouck, Mr. Duncan.

Required Courses.

1. Higher Algebra. — A brief review of radicals, quadratic equations, ratio and proportion, and progressions; binomial theorem, undetermined coefficients, summation of series, continued fractions, logarithms, theory of equations. Wells's "College Algebra." Freshmen; 5 hours a week. Credit, 5.

Associate Professor Hasbrouck and Mr. Duncan.

2. Solid Geometry. — Theorems and exercises on the properties of straight lines and planes, dihedral and polyhedral angles, prisms, pyramids and regular solids; cylinders, cones and spheres; spherical

triangles and the measurement of surfaces and solids. Wells's "Solid Geometry." Freshmen; required unless accepted for admission; 2 hours. Credit, 2. Mr. DUNCAN.

4. PLANE TRIGONOMETRY. — The trigonometric functions as lines and ratios; proofs of the principal formulas, transformations; inverse functions, use of logarithms; the applications to the solution of right and oblique triangles; practical applications. Bowser's "Elements of Plane and Spherical Trigonometry." Required unless accepted for admission. Freshmen; 3 hours. Credit, 3.
Associate Professor HASBROUCK.

5. GENERAL PHYSICS. — Elementary mechanics and heat. Lectures, recitations and laboratory work. Text, Crew's "General Physics." Sophomores; 4 hours class-room work and 1 laboratory period. Credit, 5.
Adjunct Professor HASBROUCK and Mr. DUNCAN.

Elective Courses.

6. GENERAL PHYSICS. — Electricity and light. Crew's "General Physics." Lectures, recitations and laboratory work. Sophomores; 2 hours of class-room work and 1 laboratory period. Credit, 3.
Adjunct Professor HASBROUCK and Mr. DUNCAN.

[9. ADVANCED PHYSICS. — The senior elective in physics will not be offered for the year 1909–10.
Adjunct Professor HASBROUCK.]

8. PLANE SURVEYING. — The elements of the subject, including the adjustment and use of the usual instruments. Text-book and lectures. Sophomores; 6 hours a week. Credit, 3.
Professor OSTRANDER and Mr. DUNCAN.

7. ANALYTIC GEOMETRY. — A discussion of the geometry of the line, the circle, of conic sections and of the higher plane curves. Wentworth's "Analytic Geometry." Prerequisites, Mathematics 1, 2 and 4; 3 hours a week. Credit, 3. Professor OSTRANDER.

10. — DIFFERENTIAL AND INTEGRAL CALCULUS. — A first course in the subject, with some of the more important applications. Nichol's "Differential and Integral Calculus." Prerequisites, Mathematics 1, 2, 4 and 7; 5 hours. Credit, 5.
Professor OSTRANDER.

11. Hydraulics and Sanitary Engineering.[1] — Hydrostatics, theoretical hydraulics, orifices, weirs, pipes, conduits, water supply, hydraulic motors, sewers and sewage treatment. Text-book and lectures, 3 hours. Not given in 1910–11. Credit, 3.
Professor Ostrander.

12. Advanced Surveying.[1] — Topographic and higher surveying, highway construction, earthwork, pavements and railroad construction. Text-book and lectures. Not given in 1910–11; 6 hours. Credit, 5. Professor Ostrander.

[13. Stresses in Structures.[1] — An elementary course in roof and bridge stresses. Text-book and lectures. Not given in 1909–10; 4 hours. Credit, 3. Professor Ostrander.]

[14. Strength of Materials, Foundations and Masonry Construction.[1] — Text-book and lectures. Not given in 1909–10; 5 hours. Credit, 5. Professor Ostrander.]

[15. Analytic Mechanics. — A course in theoretical mechanics, based on the calculus, with applications to problems. Text-book and lectures. Prerequisites, Mathematics 7, 10; not given in 1909–10; 3 hours. Credit, 3. Professor Ostrander.]

Department of Military Science and Tactics.

Captain Martin.

[The department of Military Science and Tactics conducts its work in conjunction with the Department of Physical Education and Hygiene, in accordance with the following statement: —

All candidates for a degree in a four-years course must take for three years three full hours a week of physical training. This work must be under college supervision, and be completed by the beginning of the senior year. At least two years of the work must be taken in the Department of Military Science and Tactics, in accordance with the requirements of the War Department; the rest is to be taken in the Department of Physical Education.

Under this arrangement, the courses in Military Science are given up to the Christmas recess and from the close of the spring recess to the end of the semester each year; the corresponding courses in Physical Education occupy the intervening time.

Under act of Congress (July 2, 1862), military instruction under a regular army officer is required in this college of all able-bodied male students. Men are excused from the exercises of this department only upon presentation of a certificate given by the college physician; minor disabilities which might bar enlistment are not considered. Students excused from military duty may be required to take equivalent work. The object of the instruction is to disseminate military knowledge in order that in emergency trained men may be found to command volunteer troops; but a further object is to give physical exercise, to teach obedience without detracting from self-respect, and to develop the bearing and courtesy that are as becoming in a citizen as in a soldier. Absences and other offences of military nature, and those of which the military instructor may take cognizance as affecting discipline, are dealt with by the commandant in accordance with the regulations of the department; but delinquencies in theoretical instruction not strictly military in their nature are dealt with in accordance with the rules of the faculty.

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[1] Instruction in civil engineering will be given in two distinct courses of one year each, the courses alternating. The courses are open to students of the junior and senior classes.

Cadets in the graduating class who have shown special aptitude for military service are reported to the Adjutant-General of the United States army and to the Adjutant-General of Massachusetts; in making appointments from civil life to the regular or volunteer army, preference is given to those who have been so reported. The names of the three most distinguished are published in the "Official Register of the United States Army." Assignments to the band are made by the military instructor. Practice in the band is credited in place of drill and theoretical instruction.

A dark blue uniform, old army pattern, costing about $15, is worn by all cadets when on military duty, and may be worn at other times. The uniforms are procured through an authorized tailor. Students upon entering college are required to deposit $15 with the college treasurer to cover the cost of the uniform. The sale of old uniforms to members of an entering class is prohibited, unless the consent of the military instructor be obtained.]

Required Courses.

1. INTRODUCTION TO MILITARY SCIENCE AND TACTICS. — Practical instruction in infantry drill regulations through the school of the battalion in close and extended order; advance and rear guards; outposts; marches; ceremonies; guard duty. Upon the conduct and proficiency of this year depends the appointment of corporals for the ensuing year. Freshmen; first semester until Christmas recess and second semester after Easter recess; 3 hours. Credit, 2.

Captain MARTIN.

2. INTRODUCTION TO MILITARY SCIENCE AND TACTICS. — As stated under Course 1. Captain MARTIN.

3. PRACTICE AND THEORY OF MILITARY SCIENCE AND TACTICS. — Practical instruction as before; pointing, aiming and sighting drills; litter drills, and first aid to the injured by detachment; target practice, in gallery and on the range. Theoretical instruction in infantry drill regulations, to include the school of the company; manual of guard duty; small arms firing regulations. Corporals are appointed from this class. On their conduct and proficiency depends the appointment of sergeants in the next class. Sophomores; first semester until Christmas recess and second semester after Easter recess; 3 hours, with an average in addition of 1 hour of instruction in theory for the full year. Credit, 2.

Captain MARTIN.

4. PRACTICE AND THEORY OF MILITARY SCIENCE AND TACTICS. — As stated under Course 3. Captain MARTIN.

5. PRACTICE AND THEORY OF HIGHER MILITARY SCIENCE AND TACTICS. — Practical instruction as before; target practice, in gal-

lery and on the range. Theoretical instruction in infantry drill regulations; to include the school of the battalion; advance and rear guards; outposts; marches and ceremonies; field service regulations; preparation of reports, returns, muster rolls, enlistment and discharge papers, rosters, requisitions, etc.; army regulations; lectures on military science. Sergeants are appointed from this class. On their conduct and proficiency depends their selection as officers for the ensuing year. When necessary, officers will also be appointed from this class. Juniors; first semester until Christmas recess and second semester after Easter recess; 3 hours, with an average in addition of 1 hour of instruction in theory for the full year. Credit, 2. Captain MARTIN.

6. PRACTICE AND THEORY OF HIGHER MILITARY SCIENCE AND TACTICS. — As stated under Course 5. Captain MARTIN.

Elective Courses.

7. ADVANCED MILITARY SCIENCE AND TACTICS. — Practical instruction as before; conduct of drills of lower classes. Officers will as a rule be selected from this class. Cadets electing Courses 7 and 8 must make the election for the year, and not later than the first Monday in June of their junior year. No cadet electing this course will after the commencement drill be permitted to change his election without the consent of the dean of the faculty and of the commandant. Seniors electing Courses 7 and 8 are required to report for three hours of work a week in the Department of Physical Education when drill is suspended. Seniors; first semester until Christmas recess and second semester after Easter recess; 3 hours. Credit, 2. Captain MARTIN.

8. ADVANCED MILITARY SCIENCE AND TACTICS. — As stated under Course 7. Captain MARTIN.

Department of Physical Education and Hygiene.

Assistant Professor REYNOLDS.

HYGIENE.

Required Courses.

1. HYGIENE. — Lectures, reading, quizzes and a report on some assigned topic of personal hygiene or sanitation. Freshmen; 1 hour. Credit, 1. Assistant Professor REYNOLDS.

PHYSICAL EDUCATION.

[The Department of Physical Education conducts its work in physical training in conjunction with the Department of Military Science and Tactics, as explained in the note preceding the description of the courses in Military Science. All classified undergraduate students are given a physical examination upon entering. A similar examination is given at the beginning of the athletic seasons to all candidates for training for class or college athletic contests.]

Required Courses.

1. ELEMENTARY GYMNASTICS. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 2. Freshmen; 3 hours. Credit, 2. Assistant Professor REYNOLDS.

2. ELEMENTARY GYMNASTICS. — As stated under Course 1. Assistant Professor REYNOLDS.

3. GRADED GYMNASTICS. — Exercises, games and athletics; from January 1 to April 1, in connection with Course 4. Sophomores; 3 hours. Credit, 2. Assistant Professor REYNOLDS.

4. GRADED GYMNASTICS. — As stated under Course 3. Assistant Professor REYNOLDS.

5. HEAVY GYMNASTICS. — Drills, games and athletics; from January 1 to April 1, in connection with Course 6. Juniors; 3 hours. Credit, 2. Assistant Professor REYNOLDS.

6. HEAVY GYMNASTICS. — As stated under Course 5. Assistant Professor REYNOLDS.

Elective Courses.

7. TRAINING COURSE. — Leadership of class and squad work; supervision of indoor and outdoor athletic contests and games; boxing and wrestling. Seniors; 3 hours. Credit, 2. Assistant Professor REYNOLDS.

8. TRAINING COURSE. — As stated under Course 7. Assistant Professor REYNOLDS.

9. ADVANCED GYMNASTICS. — For those who wish to become candidates for the gymnastic team. Credit, 0. Assistant Professor REYNOLDS.

10. ADVANCED GYMNASTICS. — As stated under Course 9. Assistant Professor REYNOLDS.

Department of Rural Social Science.

President Butterfield, Mr. Lyman, Dr. Cance.

Agricultural Economics.

Required Courses.

2. Agricultural Industry and Resources. — A descriptive course dealing with agriculture as an industry and its relation to physiography, movement of population, supply of labor, commercial development, transportation, public authority and consumers' demand. The principal agricultural resources of the United States will be studied with reference to commercial importance, geographical distribution, present condition and means of increasing the value of the product and cheapening cost of production. Lectures, assigned readings, class topics and discussions. Sophomores; 3 hours. Credit, 3. Dr. Cance.

Elective Courses.

4. Elements of Agricultural Economics. — This course is designed to follow the required work in the elements of economics. It will consider the economic principles underlying the welfare and prosperity of the farmer and those institutions upon which his economic success depends; the economic elements in the production and distribution of agricultural wealth; means of exchange; the agricultural market; determination of price; speculation; problems of land tenure and land values; business co-operation; farmers' organizations; the farmer and legislation; the maintenance of the social, political and economic status of the farmer; and the relation of the farmer to the State. Lectures, text, readings, topics and field work; 3 hours. Credit, 3. Dr. Cance.

5. Historical and Comparative Agriculture. — A general survey of agriculture, ancient and modern; feudal and early English husbandry; the later development of English agriculture; the course of agriculture in the United States, with special emphasis on present conditions and the history of agriculture in New England. An attempt will be made to measure the influence of times, peoples and countries in producing different systems of agriculture, to show that the agriculture of any country is a distinct individual problem, and to ascertain the causes now working to affect agricultural changes. Lectures, readings and library work. Seniors; open to other students upon arrangement; prerequisite, Course 4 or equivalent; 3 hours. Credit, 3. Dr. Cance.

7. SPECIFIC PROBLEMS IN AGRICULTURAL ECONOMICS. — An advanced course for students desirous of studying more intensively some of the problems immediately affecting the welfare of the farmer and society. Some of the problems that may be studied are: land problems; land tenure; size of farms; causes affecting land values; private property in land; taxation and inheritance; special problems; marketing and manufacturing farm products; co-operative enterprises and farmers' societies; cost of production; farm labor in New England; immigration; shifting of the rural population. Opportunity will be given, if practicable, for field work, and students will be encouraged to pursue lines of individual interest. Seniors; open upon arrangement to other students; enrollment subject to approval of instructor; 2 hours a week. Credit, 2. Dr. CANCE.

9. SEMINAR. — Research in agriculture: New England agriculture to 1860. Library work and reports. If desirable some other topic may be substituted. Hours to be arranged. Credit, 1.
Dr. CANCE.

10. SEMINAR. — As stated in Course 9. Dr. CANCE.

RURAL SOCIOLOGY.

12. THE RURAL COMMUNITY. — There are two general divisions of the subject. There is, first, a study of the social status of the rural population, including the significance of the movement to the cities, the present social conditions of farm people, the social effects of rural life, and the social aspect of various agricultural questions of a technical or economic character. In the second part of the study will be discussed the various social agencies in rural progress, such as means of communication, farmers' organizations, rural schools, means of agricultural education, rural religious institutions and the federation of rural social agencies. Lectures, readings and essays on assigned topics; 3 hours. Credit, 3.
President BUTTERFIELD.

RURAL LAW.

14. RURAL LAW. — This course treats of the laws relating to business, especially business associated with rural affairs, and of those relating to citizenship, domestic relations, farming contracts, riparian rights, real estate and conveyancing. Lectures; practical work such as may fit one to perform the duties of a justice of the peace. Seniors; 1 hour. Credit, 1. Mr. LYMAN.

Department of Veterinary Science.

Professor Paige.

[The courses in veterinary science have been arranged to meet the needs of students who purpose following practical agriculture, and of prospective students of human and comparative medicine.]

Elective Courses.

1. Introductory Bacteriology. — The object of this course is to acquaint the student with the various organisms found in air, water, soil, milk and the body, and with the relation of these organisms to such processes as decomposition, fermentation and digestion, and to the production of disease. Toxic substances resulting from the growth of organisms, and the antitoxins used to counteract their action, are considered. Lectures, recitations and laboratory work. Seniors; three 2-hour laboratory exercises. Credit, 3. Professor Paige.

3. Veterinary Science. — A course treating of veterinary hygiene, comparative anatomy and general pathology; veterinary materia medica and therapeutics; the theory and practice of veterinary medicine; general, special and operative surgery; and veterinary bacteriology and parasitology. Lectures, clinics, demonstrations and laboratory exercises. Must be followed by Course 4. Seniors; 5 hours. Credit, 5. Professor Paige.

4. Veterinary Science. — As stated under Course 3.
Professor Paige.

Department of Zoölogy and Geology.

ZOÖLOGY.

Required Course.

1. Elementary Zoölogy. — This forms the zoölogical part of an introductory course in biology. Laboratory dissection and lectures; laboratory text, Drew's "Invertebrate Zoölogy." Sophomores; two 2-hour laboratory periods and 1 lecture hour. Credit, 3. Assistant Professor Gordon.

Elective Courses.

3. Invertebrate Zoölogy. — This course does not include the insects. Economic zoölogy. Text-books, Parker & Haswell's "Textbook of Zoölogy," Vol. I., and Drew's "Invertebrate

Zoölogy." Prerequisite, Course 1 or its equivalent. Must be followed by Course 3. Juniors; two 2-hour laboratory periods and 1 lecture hour. Credit, 3. Assistant Professor GORDON.

4. VERTEBRATE ZOÖLOGY. — Text-book, Parker & Haswell's "Textbook of Zoölogy," Vol. II. Prerequisite, Course 3. Juniors; two 2-hour laboratory periods and 1 lecture hour. Credit, 3.
Assistant Professor GORDON.

5, 6 and 7. ADVANCED ZOÖLOGY. — See Graduate School.

GEOLOGY.

Elective Courses.

2. GENERAL GEOLOGY. — Rock-forming minerals; rock types; dynamical, structural and surface geology. Lectures, map and field work. Sophomores; one 2-hour laboratory period and 2 lecture periods. Credit, 3. Assistant Professor GORDON.

THE GRADUATE SCHOOL.

THE GRADUATE SCHOOL.

KENYON L. BUTTERFIELD, A.M., President of the College.

CHARLES H. FERNALD, Ph.D., Director of the Graduate School and Professor of Zoölogy.

Graduate courses leading to the degrees of master of science and doctor of philosophy have been given for a number of years. Demands for these courses have now greatly increased, and in recognition of the benefits to be derived from a separate organization, a distinct graduate school has been established for the purpose of fitting graduates of this and other institutions for teaching in colleges, high schools and other public schools; for positions as government, State and experiment-station agriculturists, bacteriologists, botanists, chemists, entomologists, horticulturists and zoölogists; and for numerous other positions requiring a great degree of skill and scientific knowledge.

ADMISSION.

Admission to the graduate school will be granted: —

1. To graduates of the Massachusetts Agricultural College.

2. To graduates of other institutions of good standing who have received a bachelor's degree substantially equivalent to that conferred by this college.

In case an applicant presents his diploma from an institution of good standing, but has not, as an undergraduate, taken as much of the subject he selects for his major as is required of undergraduates at the Massachusetts Agricultural College, he will be required to make up such parts of the undergraduate work in that subject as the professor in charge may consider necessary. He shall do this without credit toward his advanced degree.

Admission to the graduate school does not necessarily admit to candidacy for an advanced degree, — students holding a bachelor's degree being in some cases permitted to take graduate work without becoming candidates for higher degrees.

Applications for admission to the graduate school should be presented to the director of the school. Full statements of the applicant's previous training, of the graduate work desired, and of the amount and kind of work already done by him as an undergraduate should be submitted, — together with a statement whether the applicant desires to work for a degree.

Registration is required of all students taking graduate courses, the first registration being permitted only after the student has received an authorization card from the director.

Nature and Methods of Graduate Work.

Persons taking graduate work will find this quite different in its nature from undergraduate courses. A broad knowledge of two (or three) subjects is required, and the professors in charge of these may adopt any methods which may seem desirable to secure this to the student. Lectures, laboratory and field work in various forms are utilized; but whatever the method chosen, the aim is to train the students in methods of original investigation and experiment, inductive reasoning and the ability to carry on independent research. In addition to the lectures, a large amount of outside reading is required, the object being to give a broad knowledge of all aspects of the subjects chosen, in addition to the complete knowledge of those portions involved in or directly related to the original investigation which is to result in the thesis. Originality and ability to lead in scientific research after completing graduate work, and the establishment of a broad and thorough foundation upon which these qualities must be based, are the objects aimed at; and any methods which promise to give these results may be made use of (varying according to the nature and personal equation of each student), the supervision being largely individual rather than collective.

Candidates for the degree of master of science are required to prosecute two subjects, one of which shall be designated as the major and the other as the minor. These subjects may not be selected in the same department.

Candidates for the degree of doctor of philosophy are required to prosecute three subjects, one of which shall be designated as the major, the others as minors. No two of these subjects may be taken in the same department.

Advanced students who are not candidates for degrees may, with the approval of the faculty of the school, take more than one subject in the same department.

A statement of the subjects chosen must in each case be submitted to the director of the school for approval by the necessary committee. The chosen subjects must bear an appropriate relation to each other.

A working knowledge of French and German is essential to successful graduate work, and students not having this will find it necessary to acquire it as soon as possible after entering.

A description of the equipment of the various departments is given under "General Information."

THESES.

A thesis is required of each candidate for an advanced degree. It must be on a topic belonging to the candidate's major subject, must show that its writer possesses the ability to carry on original research, and must be an actual contribution to knowledge.

The thesis in its final form, ready for the printer, must be submitted to the director of the school for examination by the committee on the graduate school before the candidate for the doctor's degree may take the required oral examination. The candidate for the doctor's degree must be prepared to defend at the oral examination the views presented in the thesis.

All theses become the property of the department in which they are prepared. When they are printed, five copies of each thesis must be deposited with the department.

FINAL EXAMINATIONS.

For the degree of master of science, a final examination, which may be either written or oral, or both, is given upon the completion of each subject.

For the degree of doctor of philosophy, final examinations on the minors taken are given upon the completion of the subjects. In the major subject, a written examination, if successfully passed, is followed by an oral examination in the presence of the faculty of the school.

DEGREES CONFERRED.

The degree of master of science is conferred upon graduate students who have met the following requirements: —

1. The devotion of at least one year and a half to the prosecution of study in two subjects of study and research, not less than one full college year of which must be in residence.

2. The devotion of twenty hours each week to the chief or major subject, and of from twelve to sixteen hours per week to the minor subject.

3. The preparation of a thesis in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.

4. The passing of final examinations, in both major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The degree of doctor of philosophy is conferred upon graduate students who have met the following requirements: —

1. The devotion of at least three years to the prosecution of three subjects of study and research in residence at the college.

2. The devotion of twenty hours each week to the chief or major subject during the entire period, and of from twelve to sixteen hours per week for a year and a half to each minor subject.

3. The preparation of a thesis, in the major subject, constituting an actual contribution to knowledge, and accompanied by drawings if necessary.

4. The passing of final examinations, in both the major and minor subjects, to the satisfaction of the professors in charge.

5. The payment of all fees and college expenses required.

The fee for the degree of master of science is $10, and for the degree of doctor of philosophy, $25.

Courses for Degree of Master of Science.

Available either as major or minor subjects for the degree of master of science: —

Agriculture.
Botany.
Chemistry.
Entomology.
Horticulture.
Mathematics and physics.
Veterinary science.

Courses for the Degree of Doctor of Philosophy.

Available for a major subject for the degree of doctor of philosophy: —

Botany.
Chemistry.
Entomology.
Horticulture.

Available for a minor subject for the degree of doctor of philosophy: —

Agriculture.
Botany.
Chemistry.
Entomology.
Horticulture.
Zoölogy.

GENERAL OUTLINE OF COURSES FOR THE DOCTORATE.

(*a*) *Major Courses.*

BOTANY: — The following subjects in botany may be studied: —

(*a*) Vegetable physiology.
(*b*) Vegetable pathology.
(*c*) Mycology.
(*d*) Ecology.
(*e*) Taxonomy.
(*f*) Phylogeny.
(*g*) History of botany.
(*h*) History and theory of evolution.

These subjects are pursued, to a greater or less extent, as the previous training of the student and the nature of the original problem undertaken may determine. The object of the course is to give the student a technical training in botany, to develop the spirit of research and to lay a broad foundation in the subject. (As a supplement to this course the student will do well to take, in addition to his prescribed minor work, a brief course in the history of philosophy and psychology.) Extensive reading of botanical literature, both general and specific, is required in certain subjects, and occasional lectures are given. A botanical conference is held monthly, in which various new problems of botanical science are considered by graduate students and the seniors who elect botany. A thesis dealing with some economic problem in plant physiology or pathology, or in both, and containing a distinct contribution to knowledge, is required.

CHEMISTRY. — The following subjects in chemistry may be studied: —

(*a*) Inorganic analysis, qualitative (of the rarer elements) and quantitative.
(*b*) Crystallography.
(*c*) Physical chemistry.
(*d*) Descriptive and determinative mineralogy.
(*e*) Chemical geology.
(*f*) Soil formation.
(*g*) Soil physics and chemistry; gas analysis; synthetic inorganic work.
(*h*) Chemical theory and history.
(*i*) General organic chemistry.
(*j*) Special topics in organic chemistry.

(*k*) Elementary quantitative organic analysis.

(*l*) Proximate qualitative and quantitative organic analysis, including determination of organic radicles.

(*m*) Organic synthesis of aliphatic and aromatic compounds.

(*n*) Problems in chemical manufacture.

(*o*) Recent chemistry of plant nutrition.

(*p*) Animal physiological and pathological chemistry, including the chemistry of foods, of milk and milk industries, of urine, urinalysis, and the standards for feeding of all kinds.

(*q*) Toxicology.

(*r*) Insecticides and fungicides.

Frequent examinations on current chemical literature are given. Early in the course original work on some chemical subject pertaining to agriculture must be begun. The history and results of this work must, before the awarding of the degree, be submitted in the form of a thesis containing a distinct contribution to knowledge.

ENTOMOLOGY. — I. For the degree of doctor of philosophy as a major: Some knowledge of all the divisions of this subject is essential for the professional entomologist, though a large part of his time will be devoted only to certain portions. To insure some familiarity with all these divisions, lectures, laboratory work, field training or required reading are given in each of the following topics: —

(*a*) *Morphology.* — Embryology; life history and transformations; histology; phylogeny and the relation of insects to other arthropods; hermaphroditism; hybrids; parthenogenesis; pedogenesis, heterogamy; chemistry of colors of insects; luminosity; deformities of insects; variation; duration of life.

(*b*) *Ecology.* — Dimorphism; polymorphism; warning coloration; mimicry; insect architecture; fertilization of plants by insects; instincts of insects; insect products of value to man; geographical distribution in the different faunal regions; methods of distribution; insect migration; geological history of insects; insects as disseminators of disease; enemies of insects, vegetable and animal, including parasites.

(*c*) *Economic Entomology.* — General principles; insecticides; apparatus; special cases; photography of insects and their work; methods of drawing for illustrations; field work on insects and study of life histories; legislation concerning insects.

(*d*) *Systematic Entomology.* — History of entomology, including classifications and the principles of classification; laws governing nomenclature; literature, how to find and use it; indexing literature; number of insects in collections and in existence (estimated); lives of prominent entomologists; methods of collecting, preparing, preserving and shipping insects; important collections of insects.

(*e*) *Seminar.* — A monthly meeting of graduates, at which reports on current literature are presented and various entomological topics of importance are discussed.

(*f*) *Required Readings.* — The best articles on the various topics named above and on the different orders of insects, to cover from fifteen thousand to twenty thousand pages of English, French and German, the candidate to be examined at the close of his course on this with his other work.

(*g*) *Thesis.* — A thesis, illustrated with drawings, consisting of the results of original investigation upon one or several topics, and constituting a distinct contribution to knowledge, must be completed before the final examinations are taken.

II. For the degree of doctor of philosophy as a minor, and for the degree of master of science either as a major or minor: Such portions of the course outlined above as seem most appropriate to their other subjects are given to students taking entomology under these conditions.

HORTICULTURE. — The work in horticulture necessarily varies considerably with different candidates, since its most important features are specialization, original investigation and the development of individual initiative in dealing with new questions. Each candidate must select some special field of horticultural study, and devote himself to it continuously. He will be required to attend lectures, conferences and seminars dealing with horticulture in its broader aspects, and to do advanced work in the following subjects: —

(*a*) Systematic pomology.
(*b*) Pomological practice.
(*c*) Commercial pomology.
(*d*) Systematic, practical and commercial olericulture.
(*e*) Greenhouse plants and problems.
(*f*) Floriculture.
(*g*) Landscape gardening.
(*h*) Plant breeding and general evolution.
(*i*) Questions of physiology connected with propagation and pruning.

Other requirements and opportunities are (1) periodical seminars, with special lectures by prominent men from outside the college; (2) extensive and systematically planned readings; (3) frequent visits, always with definite purpose, to orchards, gardens, greenhouses, estates and libraries outside the college grounds; and (4) the preparation and publication of a thesis which shall set forth the results of the candidate's major study, and be an original and positive contribution to horticultural knowledge.

(*b*) *Minor Courses.*

ZOÖLOGY. — The courses in zoölogy are offered as a minor course to candidates for the degree of doctor of philosophy. They constitute an intensive course designed to give a broad outlook and to meet the needs of the specialist, and call for original investigation, laboratory dissection, technique and museum work. The subjects treated and the work done will vary according to circumstances, but may be outlined thus: —

(*a*) General and comparative anatomy, both gross and microscopic; ontogeny and phylogeny; life cycles, metamorphosis and metagenesis; animal associations, colonial, commensal and parasitic, and symbiotic associations of animals and plants; adaptation, adaptive radiation and parallelisms.

(*b*) Geologic, geographic and bathymetric distribution of animals.

(*c*) Systematic zoölogy, including paleozoölogy; museum and field technique.

(*d*) Economic zoölogy.

(*e*) History and development of zoölogical science.

(*f*) Weekly seminar and journal club meetings, in which all advanced students of zoölogy take an active part.

(*g*) Collateral reading; general knowledge of current zoölogical literature.

OTHER SUBJECTS. — Courses in the other subjects open to choice as minors will be outlined according to the qualification and needs of the students applying for them.

SHORT COURSES.

SHORT COURSES.

SUMMER SCHOOL.

Purposes and Methods.

The summer school of the Massachusetts Agricultural College was organized in 1907, under an act of the Legislature authorizing a normal department at the college. The main purpose has from the first been to train teachers in elementary agriculture and nature study, so that these subjects may be effectively presented in the schools. The work, however, was considerably broadened in 1908, there being two principal innovations: (*a*) the addition of a considerable number of technical courses in agriculture and horticulture, without special reference to the needs of teachers; and (*b*) the addition of courses in rural sociology and economics for the special benefit of country clergymen. Some further extension of the work may be expected in 1909. Most of the instruction is given outdoors in demonstration, practicums and observation exercises. Instructors are chosen from the faculty of the Massachusetts Agricultural College and elsewhere.

Faculty (1908).

KENYON L. BUTTERFIELD, President of the college.
Prof. FRANK A. WAUGH, Dean of the summer school; School Gardening.
Asst.-Prof. EDWARD A. WHITE, Floriculture and Arboriculture.
Prof. G. E. STONE, Plant Physiology.
Asst.-Prof. A. VINCENT OSMUN, Plant Life.
Prof. W. D. HURD (University of Maine), Field Crops and Agricultural Industry.
Prof. T. N. CARVER (Harvard University), Agricultural Economics.
Prof. H. T. FERNALD, Insect Life.
Prof. J. A. FOORD, Soils and Tillage.
Mr. R. L. GRIBBEN, Domestic Animals.
Prof. W. R. HART, Agricultural Pedagogy.
Mr. F. B. JENKS, High School Agriculture.
Prin. A. C. MONAHAN (Turners Falls High School), High School Chemistry.
Mr. H. F. TOMPSON, Practical Gardening.
Prof. W. H. DUDLEY (Wisconsin Normal School), Bird Life.
Mr. F. M. GRACEY, Drawing.

Courses of Study.[1]

1. Agricultural Pedagogy. — Pedagogy with reference to its vocational aspects; the growth and function of professional and technical schools, with suggestions of the meaning of agriculture in modern education. Part of the course bears directly upon the materials and methods of teaching agriculture in the elementary grades. Five exercises weekly for first four weeks.
Professor Hart.

2. High School Agriculture. — The organization of high schools for the teaching of agriculture; equipment, courses of study, etc. A major portion of the course will be devoted to actual exercises, largely practicums, suitable for use in high schools. Five exercises weekly for first four weeks. Mr. Jenks.

3. High School Chemistry. — Courses of study and equipment for general high school chemistry, with special reference to agriculture and the industries, with a considerable number of practical exercises designed to show how agricultural and industrial matters may be introduced into high school courses with advantage. Five exercises weekly for first four weeks.
Mr. Monahan.

4. Soils and Tillage. — The chemical, physical and biological composition of the soil, and the relation of each to plant growth; the formation of soils; natural and artificial sources of fertility; the methods and implements of tillage: the whole forming an introduction to modern scientific agriculture. Five exercises weekly for the first two weeks. Should be followed by Course 5.
Professor Foord.

5. Field Crops. — Class room, laboratory and field exercises designed to show modern methods of managing the principal field crops of New England, such as the grasses, the clovers, corn, potatoes, etc. Five exercises weekly for second two weeks. Should be preceded by Course 4. Professor Hurd.

6. Domestic Animals. — The different breeds of horses, cattle, swine, etc.; modern methods of care, sanitation, breeding and feed-

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[1] Some extension and change of the work as here outlined will be made in 1909. A revised outline will be sent upon application.

ing. This course will be especially adapted to those who have an amateur interest in live stock, but many of the exercises can be used in the hands of skilful teachers for regular school work. Five exercises weekly for four weeks. Mr. GRIBBEN.

7. PRACTICAL GARDENING. — Practical field exercises in planting, training, cultivation, etc. No special effort will be made to put the work into common school form, but the exercises will be specially valuable to school-garden teachers. Course limited to 20 pupils. Five exercises weekly, two hours each for first four weeks. Mr. TOMPSON.

8. GARDENING INVESTIGATIONS. — Especially designed to develop a new point of view with reference to agriculture and nature study. Each pupil will be put to work in the garden and left to her own resources. So far as possible, no information whatever will be given by the instructor, the endeavor being to answer a great variety of questions through the investigations of the pupils. Suited to advanced teachers. Course limited to 40 pupils. Five exercises weekly, two hours each, for four weeks. Dean WAUGH.

9. TREES AND SHRUBS. — A practical course in arboriculture, covering native and exotic trees and shrubs, their identification, propagation and culture. The work will be largely given in the field. Three exercises weekly for four weeks. Assistant Professor WHITE.

10. FLORICULTURE. — Hardy annual and perennial flowering plants and those cultivated in the house or under glass. Course limited to 15 pupils. Two exercises weekly for four weeks. Assistant Professor WHITE.

11. PLANT LIFE. — Elements of morphology, structure and classification, with special reference to mushrooms and ferns. Five exercises weekly for two weeks, July 20–31. Assistant Professor OSMUN.

12. ELEMENTARY PLANT PHYSIOLOGY. — Simple experiments in plant life with home-made apparatus. Five exercises weekly for first two weeks. Professor STONE.

13. BIRD LIFE. — Given with special reference to the economic relations of birds and the study of nesting habits. Five exercises weekly for the first two weeks of the term.

Professor DUDLEY.

14. INSECT LIFE. — Given with special reference to the school study of economic insects and modern methods of combating them. Five exercises weekly for the second two weeks of the course.

Professor FERNALD.

15. NATURE STUDY DRAWING. — For teachers who wish to make greater use of drawing lessons in handling nature study subjects. Course limited to 40 pupils. Five exercises weekly for four weeks.

Mr. GRACEY.

16. FORESTRY. — Forest species, forest composition, regeneration, management, exploitation, etc., with some attention to the economics of forestry, and with special reference to New England conditions. Lectures and field exercises, four exercises weekly for two weeks, August 3–14. Assistant Professor WHITE.

17. THE AGRICULTURAL INDUSTRY IN NEW ENGLAND. — An outline of the agricultural situation in New England and of the farmers' business problems. Five exercises weekly for last two weeks. Professor HURD.

18. AGRICULTURAL ECONOMICS. — A survey of the industry of agriculture as a whole and its relation to other industries; national and world conditions in agriculture. Five times weekly for last two weeks. Professor CARVER.

19. THE SOCIAL ASPECT OF AGRICULTURE. — Given with special reference to the relation of the country church to the rural problem. Five lectures a week for last two weeks.

President BUTTERFIELD.

WINTER SCHOOL.

Purposes and Methods.

The short winter courses are offered to meet the needs of those, both young and old, who wish to study principles and modern methods in agriculture, and who are unable to attend the four-year courses. The work begins the first Tuesday in January and continues for ten weeks. Students are required to elect courses to make not more than twenty nor less than twelve exercises each week. The arrangement of courses is such that students must follow certain definite lines of work. All elections and all deviations from the rule must be approved by the professor in charge of the winter school. The courses are open to both men and women. Applicants must be eighteen years of age and must furnish satisfactory evidence of good moral character. Attendance upon chapel and the weekly assembly is required. The usual fees are charged for apparatus and materials used in laboratories.

Courses of Instruction.

	Hours a Week.
Soil fertility,	3
Horticulture, market gardening and fruit growing,	3
Floriculture,	5
Forage crops,	2
Breeds of live stock and animal breeding,	3
Live-stock feeding and management,	2
Animal diseases and stable sanitation,	2
Farm dairying,	5
Dairy industry,	8
Dairy bacteriology,	2
Botany,	3
Entomology,	3
Dairy mechanics,	1
Farm bookkeeping,	1

Course in Bee Culture.

This course will be given, if applied for by at least six students, beginning the fourth Wednesday in May and continuing two weeks. Lectures by specialists will be included. It will include the work outlined in the following summary: —

	Total Hours.
The structure of bees, with special reference to their work, Prof. H. T. Fernald.	3
Flowers and fruits in their relation to bees, Professor Stone.	5
Honey crops and how to grow them, Professor Brooks.	5
Bees and bee-keepers' supplies, Professor Paige.	10
Work in the apiary, under the direction of an expert,	20

GENERAL INFORMATION.

GENERAL INFORMATION.

A. FINANCIAL AND ADMINISTRATIVE.

STUDENT EXPENSES.

TUITION. — Tuition is free to citizens of the United States; but students who are citizens of Massachusetts should apply to the senator of the district in which they live for a free scholarship. Blank application forms may be obtained from the registrar. The tuition charged persons not citizens of the United States is $120 a year.

DORMITORIES AND BOARD. — The college has dormitory accommodation for about 64 students. The rooms in the dormitories are occupied chiefly by the upper classmen, hence new students as a rule are obliged to room in private houses. The rooms in the college dormitories are unfurnished. They are arranged in suites of three, — one study room and two bed rooms. They are heated with steam and lighted with electricity. Students care for their rooms themselves. The rent for each person ranges from $39 to $66 a year. The rent for furnished rooms in private houses ranges from $1 to $2 a week for each occupant. In Draper Hall (the dining hall) rooms are provided for women students. The rental is $1.50 per week for each person. All correspondence in regard to rooms should be addressed to the dean of the college.

Board can be had at the college dining hall. Good board is furnished at cost. At present the price of board is $3.75 a week, but the college does not promise to keep the price at that figure; it may be more and it may be less.

EXPENSES.

The necessary college expenses per year are estimated as follows: —

	Low.	High.
Tuition: Citizens of Massachusetts free through State scholarships; other citizens of the United States free; foreigners, $120 a year.		
Room in college dormitories or in private houses, ...	$39	$75
Board in college dining hall, $3.75 a week, ...	135	135
Laundry, 50 cents to 85 cents a week, ...	18	30
Military uniform, first year, ...	15	15
Laboratory fees, ...	2	20
Books, stationery and other miscellaneous, ...	16	50
	$225	$325

Other Expenses. — Prospective students should understand that the above estimates cover expenses which may be called strictly college expenses, and that there are other financial demands made upon students which they should expect to meet. Chief among these are class assessments, support for the Musical Association and the Y. M. C. A., and taxes levied for maintenance of various student organizations, such as the Social Union, Athletic Association, college "Signal" (paper), etc. Such expenses vary from $15 to $30 a year. Additional financial responsibility is assumed by students joining a fraternity. Students rooming in college dormitories are obliged to equip their rooms with furniture. Besides the amount necessary for clothes, the economical student will probably spend between $250 and $350 a year.

Student Aid.

Self Help. — A number of students find opportunities for earning money without depending on the labor fund, and many rely upon labor of some sort to earn their way through college. A few men have paid all their way through college; a great many more have paid a large part of their expenses; and many have earned a small proportion of the cost of their course. But the college recommends that no new student enter without having at least $150 with which to pay his way until he can establish himself at work. The college does not encourage students to enter without money in the expectation of earning their way. The ordinary student will find it better either to work and accumulate money before coming to college, or to take more than four years in college, or, instead, to borrow money with which to complete his course. No student should undertake work that interferes with his studies, and students should remember that, owing to the large number of applications for labor-fund employment, no one man can receive a large amount from that source.

LABOR FUND. — An annual appropriation of $5,000 for student labor is received from the State. This fund is used only in assisting students who are citizens of Massachusetts and dependent entirely or in part on their own exertions. So far as possible such students will be employed in some department of the college. The Department of Agriculture and the Department of Horticulture usually afford the most work. Application for student labor should be made directly to the president. Applicants must present a certificate signed by parent or guardian and by one of the selectmen of the town in which they reside, showing that they need the aid. Students whose deportment or class work is not satisfactory are not likely to be continued in student labor.

SPECIAL NOTICE TO NEEDY STUDENTS. — In the last year or two the demand for paid labor on the part of new students has exceeded the amount of employment that the college can offer. The college has, therefore, established a bureau through which it will attempt to find work for new students about the village and on adjacent farms. But it cannot promise work for any students, particularly freshmen. The college accordingly urges prospective students who are dependent upon their own efforts not to undertake the course before they have enough money to carry them through or nearly through the first year.

STUDENT ACCOUNTS.

The following rules are in force concerning student accounts: —

No student will be allowed to graduate until all bills due from him to the institution are paid.

College charges, such as room rent, laboratory fees, tuition, etc., must be paid strictly in advance at the beginning of each semester. No student will be allowed to register until such payments are made.

Every student boarding at Draper Hall shall pay at the beginning of each semester at least one month's board in advance; and no student shall be allowed to continue to board at Draper Hall if more than one month in arrears in his payments.

All money due for student labor shall be applied on account toward any bills that the student may owe to the institution.

Laboratory Fees.

	Per Semester.
Botany: —	
Graduates,	$4 00
Senior year,	3 00
Junior year, first semester,	3 00
Junior year, second semester,	1 00
Sophomore year, second semester,	3 00
Chemistry: —	
Courses 4, 7, 8, each,	3 00
Courses 6, 11, 12, 14, 16, 18, each,	5 00
Deposit for breakage, etc., any course,	5 00
Entomology: —	
Seniors,	3 00
Landscape gardening: —	
Senior year,	4 00
Junior year,	2 50
Zoölogy: —	
Sophomore year,	2 00
Other years,	4 00

B. ACADEMIC AND DEPARTMENTAL.

Degrees.

Those who complete the four-years course receive the degree of bachelor of science. Those who receive this degree may also, upon payment of a fee, receive the degree of bachelor of science (B.Sc.) from Boston University (see page 9); but the candidate must meet the conditions imposed by the university concerning preparatory studies. The fee for graduation from the college is $5; that for the degree of Boston University is $10.

Graduate students who complete the assigned courses will receive the degree of master of science (M.Sc.) (fee, $10). Credit may sometimes be allowed toward this degree for teaching or other advanced work done in some department of the college.

Graduate students who complete the required three-years course of study and present a satisfactory thesis will be granted the degree of doctor of philosophy (fee, $25).

Those to whom degrees are awarded must present themselves in person at commencement to receive them. Honorary degrees are not conferred.

SCHOLARSHIPS AND PRIZES.

Scholarships.

The income of gifts from different persons is distributed in scholarships to worthy students requiring aid. The funds supporting these scholarships are: —

1. The Mary Robinson fund of $1,000, the bequest of Miss Mary Robinson of Medfield.

2. The Whiting Street fund of $1,000, the bequest of Whiting Street of Northampton.

3. The Henry Gassett fund of $1,000, the bequest of Henry Gassett of North Weymouth.

Prizes.

Prizes are given annually in several departments for excellence in study or for special achievement. The prizes offered for 1909 are: —

AGRICULTURE. — The Grinnell prizes (first, second and third), given by the Hon. William Claflin of Boston in honor of George B. Grinnell, Esq., of New York, to those members of the senior class who pass the best, second best and third best examinations, oral and written, in theoretical and practical agriculture. They are $25, $15 and $10.

BOTANY. — The Hills prizes (amounting to $35), given by Henry F. Hills of Amherst, will be awarded to members of the senior class as follows: for the best herbarium, $15; for the best collection of Massachusetts trees and shrubs, $10; for the best collection of Massachusetts woods, $10. No collection deemed unworthy of a prize will be considered. In 1909, a prize of $5 is offered to that member of the freshman class who presents the best herbarium of native flowering plants.

ENGLISH. — The Flint prizes (first, $30; second, $20) are awarded under certain restrictions to those members of the junior class delivering the best and the second best oration. Both composition and delivery are considered.

The Burnham prizes in English, given by the late T. O. H. P. Burnham of Boston, are awarded as follows: To freshmen, for excellence in declamation, two prizes: first, $25; second, $20. The speakers are chosen through a series of competitions.

ENTOMOLOGY. — Professional entomologists among the alumni of the college offer two prizes for the best work done in entomology by undergraduates. The prizes ($20 and $10) are awarded by the

Department of Entomology according to a scale of points announced in advance.

FORESTRY. — The J. W. D. French prize ($25) is given by the Bay State Agricultural Society to that member of the senior class who writes the best essay on forestry.

GENERAL IMPROVEMENT. — The Western Alumni Association prize ($25) is given to that member of the sophomore class who during his first two years in college has shown the greatest improvement in scholarship, character, and example.

Winter Course Prizes for 1909.

1. Given by the Bowker Fertilizer Company, Boston, to the student who is most familiar with the nature and composition of fertilizers and their use, one-half ton Stockbridge fertilizer.
2. Given by the German Kali Works, New York City, for the best essay on the use of fertilizers with particular reference to the use of potash, one ton of kainit or its value in gold.

Military Diplomas.

Military diplomas are given to those men receiving the degree of bachelor of science who by their work in the Department of Military Science have shown themselves worthy of distinction. These diplomas recommend those receiving them for commissions in the United States army or the militia of the several States.

EQUIPMENT.

AGRONOMY. — The work in agronomy is carried on by means of lectures, laboratory work and field work. The laboratories are in the north wing of South College. The seed laboratory is equipped with samples of the different grains and seeds of economic importance in field culture, and with apparatus for the study and testing of these seeds, including microscopes and the apparatus necessary for viability and purity tests. The soil laboratory is well equipped with apparatus for the study of the physical properties of soils, including an electric centrifuge; an electric resistance thermometer for determining soil and other temperatures; evaporimeters and drying ovens; and good balances. For the work in drainage there is available a good surveyor's transit, a wye level and two drainage levels, rods, steel tapes, surveyors' pins, and a set of drainage tools. The college farm may also be considered a part of the agronomy laboratory.

Animal Husbandry. — An important part of the equipment for laboratory work in animal husbandry is the live stock of the college farm, which includes pure-bred and grade Ayrshire, Guernsey, Holstein and Jersey cattle, French coach, Percheron and Clydesdale horses, and Berkshire and Yorkshire swine. A set of plaster-of-paris models of individuals of foreign and domestic breeds of horses, cattle, sheep and swine, and a collection of the different food stuffs available for the use of the New England farmer, are included in the equipment for this work.

Botany. — The department of botany occupies Clark Hall, a brick building 55 by 95 feet, two stories high, with basement and attic. It has two lecture rooms, one seating 154 and the other seating 72 people; one seminar and herbarium room; a large laboratory for sophomore and junior work, and one for senior work; and three rooms specially fitted for graduate students. The experiment station laboratories devoted to botanical research are also in this building. A small museum contains material especially useful in the teaching and illustration of plant phenomena; and on the third floor is a collection of Massachusetts timber trees, specimens showing peculiar formations of plant growth, and various specimens illustrative of scientific methods of treating trees.

The laboratories and lecture rooms are of modern construction, finely lighted and supplied with all necessary conveniences. The basement contains a bacteriological laboratory, a seed and soil room; and a convenient workshop provided with benches for wood and metal work, an electric motor, a power lathe, and other tools and appliances. In the senior laboratory is a room designed especially for physiological work; this laboratory is well supplied also with apparatus for the study of simple phenomena in plant physiology, such as respiration, metabolism, transpiration, heliotropism, etc. The herbarium contains 15,000 species of flowering plants and ferns, 1,200 sheets of mosses, 1,200 sheets of lichens and liverworts, and about 12,000 sheets of fungi. The laboratory is equipped with 85 modern compound microscopes and a number of dissecting microscopes, microtomes and a large series of charts. A conservatory 28 by 70 feet is connected with the laboratory. This is designed for experiment work and for housing material often needed in the laboratory.

Chemistry. — The department of chemistry has rooms adapted to chemical uses, supplied with a large assortment of apparatus and chemical materials. The lecture room on the second floor seats 70 students. Immediately adjoining it are four smaller rooms for apparatus and the preparation of materials for the lecture table. The laboratory for beginners is furnished with 40 working-tables. Each table is provided with reagents and apparatus for independent work. A well-equipped laboratory for advanced work is also provided. The weighing room has 6 balances and improved apparatus for determining densities of solids, liquids and gases. The equipment includes also a microscope, a spectroscope, a polariscope, a photometer, a barometer, numerous models, and an extensive collection of industrial charts, and there is a valuable and growing collection of specimens and samples. The latter includes rocks, minerals, soils, raw and manufactured fertilizers, foods, milk products, fibers, various other vegetable and animal products, and artificial preparations of mineral and organic compounds. With this should also be mentioned a series of preparations used for illustrating the various stages of different manufactures, from raw material to finished product.

DAIRYING. — Two large, well-drained, cement-floored rooms in the South College are used for dairy work. These are equipped with a milk heater, separators, coolers and aërators, a pasteurizer, ripening vats, churns, butter workers, a mechanical can washer, a sterilizer, and other small apparatus necessary to a well-equipped dairy or butter factory. A third room is equipped with hand and power Babcock milk-testing machines and other apparatus used for milk and butter testing. These rooms have individual lockers for students. The new sanitary dairy and stable give an opportunity for practical laboratory work in the production and handling of certified milk.

DINING HALL. — Draper Hall, a brick colonial building, equipped with the modern conveniences of a dining hall, was opened in 1903. It contains a number of suites of rooms reserved for women students. The dining service is under the supervision of the college.

DRAWING. — Two rooms on the second floor of Wilder Hall are occupied by the classes in drawing. They are equipped with tables and adjustable drawing stands. The necessary materials and implements are provided. The equipment includes drawing models, and plaster casts of leaves, flowers, fruits, human and architectural details, and garden ornaments, two universal drafting machines, an eidograph, centrolineads, a set of ship splines and French curves, complete water-color outfits, automatic crosshatchers and protractors.

ENTOMOLOGY. — *Entomological Laboratory.* — The equipment for work in entomology for seniors and for graduate students is unusually good. The laboratory building contains a large room for laboratory work, provided with tables, dissecting and compound microscopes, microtomes, reagents and the usual laboratory implements. One part of the building is fitted up as a lecture room. Another part is devoted to library purposes, and contains a card catalogue of more than 50,000 cards, indexing the literature on insects. Besides the well-selected list of entomological works in this room, there are in the college library an unusual number of rare and valuable books on this subject. These libraries are supplemented by the private libraries of the professors in charge, which contain more than 25,000 volumes, many of which cannot be found elsewhere in the United States. In another room is a large and growing collection of insects, both in the adult and in the early stages. As the laboratory is associated with the insectary of the college experiment station, the facilities of the latter are directly available. The apparatus room of the insectary, with its samples of spray pumps, nozzles and other articles for the practical treatment of insects; the chemical room, fitted for the analysis of insecticides and for other chemico-entomological work; and a greenhouse where plants infected with injurious insects are under continual observation and experimental treatment, are all open to the student; and in addition are provided several private laboratory rooms and a photographing room with an unusually good equipment of cameras. The large greenhouses, grounds, gardens and orchards of the college provide further for study under natural conditions of a wide range of subjects relating to injurious insects.

FARM ADMINISTRATION. — The college farm of 190 acres is under the supervision of the Department of Farm Administration, and furnishes demonstration material. It includes improved land, pasture land and a farm wood lot. The improved land illustrates the value of good culture and the best known methods for the maintenance of fertility. The work in this department includes the production of the common field crops, and the care and raising of the different classes of live stock mentioned under animal husbandry. The farm is equipped with suitable buildings and good machinery for the work carried on, of which the production of certified milk is an important branch. Several good farms in the vicinity, illustrating types of both special and general agriculture, may be inspected and studied.

FLORICULTURE. — The department of floriculture aims to give the student a thorough knowledge of all phases in greenhouse design and construction and greenhouse heating, and in the culture of florists' crops. It is intended to train men for commercial floriculture and for the management of conservatories on private estates and parks and in cemeteries. The course is outlined to combine theoretical, technical and practical work in the most comprehensive manner possible. Probably no agricultural college has a department of floriculture better equipped than this. The legislative appropriation of 1908 has made possible the erection of a durable, practical, commercial range, composed of palm, fern, orchid, violet, carnation, rose and students' houses. French Hall, with its large laboratories, class rooms and offices, furnishes excellent facilities for the purposes of instruction. Besides the new glass houses, there are older houses suitable for growing bedding plants and chrysanthemums, and frames for the growing of annual and herbaceous perennial plants, violets and pansies. Many excellent specimens of trees and shrubs are growing on the college grounds, furnishing valuable material for the study of arboriculture.

GEOLOGY. — The teaching in geology is illustrated with a very complete series of minerals, the State collection of rocks of Massachusetts, a series of Ward's fossils and casts of fossils, and models and charts.

HEATING, LIGHTING AND POWER. — The college supplies its own light, heat and power, including electricity for the night lighting of the campus and its approaches. The machinery of the barn, the dairy and other buildings is operated by electricity generated at the power-house. The college has also a machine shop.

LANDSCAPE GARDENING. — The work in landscape gardening is developed in a strong technical four-years course; the first two years are occupied with required studies, including botany, horticulture, surveying and mathematics, and the last two years are devoted to more specialized studies in landscape gardening, arboriculture, floriculture, entomology, botany and mathematics. The environment is unusually favorable. The strictly technical work in landscape gardening is taught in light and comfortable drafting rooms, fully furnished with instruments and accessories for exacting work. There is a well-selected library, and the equipment of surveying and drafting instruments is unusually complete and practical.

LIBRARY. — The library occupies the lower floor of the Library-Chapel building. It contains nearly 32,000 books. Among these. scientific treatises predominate, but history, economics and literature are well represented. Indeed, the library has grown so rapidly that additional room has become necessary. The reading room supplies good periodicals, both technical and non-technical; encyclopedias and general reference books; and a selected collection of works for general reading.

MARKET GARDENING. — The purpose of the courses in market gardening is to acquaint the student with the theories and practice of market gardening so that he will be able to carry on the business intelligently. The equipment available for practical work consists of 10 acres of good gardening land; a large collection of horse and hand garden tools; hot-beds and cold-frames; and lettuce, cucumber and tomato houses. The students therefore have opportunity both to study and to practice the important branches of the business. Classes are taught in French Hall, a new building fitted with class rooms and a laboratory particularly equipped for floriculture and market gardening. A good library of works on vegetable gardening is available.

MATHEMATICS, PHYSICS AND CIVIL ENGINEERING. — *Surveying.* — The department has a considerable number of the usual surveying instruments, with the use of which the students are required to become familiar by doing field work. Among the larger instruments are 2 plain compasses, a railroad compass with telescope, a surveyor's transit, 2 engineer's transits with vertical arc and level, a Brandis solar transit, a solar compass, an omnimeter with verniers reading to 10 seconds, adapted to geodetic work, a Queen plane table, 2 wye levels, a dumpy level, a builder's level, a sextant, a hand level, and a large assortment of leveling rods, flag poles, chains, tapes, etc. For drafting, a vernier protractor, a pantograph, a parallel rule, etc., are available. The department also has a Fairbanks cement testing outfit.

Physics. — Among the apparatus in use for instruction in general physics are a set of United States standard weights and measures, precision balances, a spherometer, vernier calipers, a projection lantern, etc.; in mechanics, a seconds clock, systems of pulleys and levers, and apparatus to illustrate the laws of falling bodies and motion on an inclined plane, and the phenomena connected with the mechanics of liquids and gases. The department is equipped with the usual apparatus for lecture illustration in heat, light and sound; in electricity, the equipment consists of apparatus for both lecture illustration and laboratory work, including a full set of Weston ammeters and volt meters, a Carhart-Clark standard cell, a Mascart quadrant electrometer, a Siemens electro-dynamometer, and reflecting galvanometers and Wheatstone bridges for ordinary determinations of currents and resistances.

Military Science. — This department makes use of the campus for battalion drill, and has a special building in which there is a drill room 60 by 135 feet, an armory, a recitation room, an office for the commandant, a field-gun and gallery practice room and a large bathroom. The national government supplies Krag-Jorgensen rifles, with complete equipments and ammunition. The State supplies instruments for the college band. Students are held responsible for all articles of public property in their possession. The college owns an excellent target range for rifle practice, lying a short distance out of the village.

Physical Education. — The gymnasium and armory has a floor space of 5,000 square feet, and is 30 feet high, well lighted and ventilated. The room used for exercise and recreation is equipped with modern developing apparatus and two hand-ball courts, and is large enough for basket ball. The apparatus can quickly be removed to clear the floor. An out-door board track enables students to secure track practice through the winter. Steel lockers and bathrooms have been installed in North and South colleges, and the gymnasium is to be fitted with a model bathroom. The gymnasium is open from 9 a.m. to 10 p.m., and exercise may be taken at such hours as do not conflict with military drill or physical education classes. The regulation costume for class exercise consists of a white track suit and white, rubber-sole shoes.

Pomology. — The department of pomology has 10 acres of orchard, including apple, pear, peach, plum, cherry and quince trees. Of particular interest is the large collection of these fruits on the various dwarf stocks, showing many types of training. The recent revival of interest in dwarf fruits makes these dwarf orchards of especial value to students. There is also a commercial vineyard and a smaller one; in these are shown the principal types of trellis and the leading methods of training grapes. Several acres are used in growing the various kinds of small fruits, such as strawberries, raspberries, blackberries, currants and gooseberries. There are also extensive nurseries, where all of these various types of fruits are grown, in which students may see them in all stages of development.

The department has a good equipment of orchard and nursery tools of all the principal types, the use of which enables students to learn the value of each type. For other orchard operations, such as spraying and pruning, the most approved makes of pumps, nozzles, pruning saws, knives, etc., are provided. For laboratory work in systematic pomology there is a collection of more than 100 wax models of apples and plums in natural colors, which are particularly valuable in identifying varieties of these fruits unknown to the student. The laboratory is also furnished with a large number of reference books on pomology; and fruit in a fresh condition is available in great variety, not only from the college orchards but from other parts of Massachusetts and from many other States. In 1908–09, for instance, apples for class use were received from British Columbia, Ontario, Quebec, Nova Scotia, Iowa, Wisconsin, Michigan, Connecticut, New York, Oklahoma, Kansas, Colorado, Oregon, New Jersey, and Vermont, besides collections of grapes from California and citrous fruits from Florida and Texas.

VETERINARY SCIENCE AND BACTERIOLOGY. — The department of veterinary science and bacteriology occupies a modern laboratory and hospital stable, both built in accordance with the latest principles of sanitation. Every precaution has been taken in the arrangement of details to prevent the spread of disease, and to provide for effective heating, lighting, ventilation and disinfection.

The main building contains a large working laboratory for student use, and several small private laboratories for special work. There are a lecture hall, a museum, a demonstration room, a photographing room and a work shop. The hospital stable contains a pharmacy, an operating hall, a post-mortem and dissecting room, a poultry section, a section for cats and dogs, and 6 sections, separated from each other, for horses, cattle, sheep and swine. The laboratory equipment consists of a dissectible Auzoux model of the horse and Auzoux models of the foot and the leg, showing the anatomy and the diseases of every part. The laboratories also have modern, high-power microscopes, microtomes, incubators and sterilizers, for work in bacteriology and parasitology. There are skeletons of the horse, the cow, the sheep, the dog and the pig, and a growing collection of anatomical and pathological specimens. The lecture room is provided with numerous maps, charts and diagrams.

ZOÖLOGY. — A large and well-lighted room in the South College is equipped as a zoölogical laboratory. It has the best apparatus, consisting of microscopes, both simple and compound, a microtome, a paraffin bath, an incubator, dissecting instruments and other necessary apparatus. A reference library which includes the current zoölogical and geological journals is kept in this room, and there are ample aquaria in which living aquatic forms may be studied.

The lecture room is a large room in South College. It is supplied with an electric projection lantern, a set of Leuckart charts, various special charts and a complete set of Auzoux models illustrative of human and comparative anatomy. A special set of topical specimens is used for class illustration, and the more extensive museum collection is drawn upon for the same purpose.

The museum is relied on mainly for specimens illustrating the forms treated of in the lecture and the laboratory courses. In addition to this, the aim has been to show as fully as possible the fauna of Massachusetts, and types that show especially the evolution and the relationship of the members of the animal kingdom. The collection consists of more than 11,000 specimens. The museum is open to the public on Saturdays from 1 to 5 P.M. and on other week days from 2.15 to 4.15 P.M. The curator is Assistant Professor Gordon.

College Activities.

Religious Services.

Chapel services are held four mornings a week. On Wednesday, instead of chapel an afternoon assembly is held, for which an attempt is made to secure speakers who will present important current subjects. Students are required to attend chapel and assembly.

The Young Men's Christian Association of the college holds a short religious meeting in the chapel on Thursday evenings, and conducts several Bible classes. For part of the year the college and the Y. M. C. A. unite in Sunday vespers, held in the chapel. At vespers a prominent clergyman or layman speaks.

Student Organizations.

A large number of student organizations furnish opportunity for work and leadership to students.

The Massachusetts Agricultural College Social Union has recently been established. All students become members by paying a small fee; the Union is designed to become the center of student interests. It has equipped in North College a trophy room and a large lounging room for music, games, reading and study; and in the fall and winter months it gives a series of entertainments, free to the students and faculty.

The Young Men's Christian Association is active both socially and religiously.

The College Senate is composed of representatives of the senior and junior classes. It serves as a general director of undergraduate conduct, and represents before the faculty the interests of the student body.

The musical organizations include an orchestra, a glee club and a quartette. These furnish music for college meetings, and occasionally give concerts. A military band is maintained as part of the cadet corps.

The Athletic Association represents in the college the interests of the football, baseball, basketball, track, hockey and tennis teams.

Among the other clubs are the Mettewampe Club, organized for walking and other outdoor recreation, and a debating club.

The college publications are the "Signal," published bi-weekly by the student body, and the "Index," published annually by the junior class.

Clubs, Conferences and Seminars.

The College Chemical Club is designed to bring the students of chemistry into closer relationship. Original papers are often read by the members, seminars are held, and outside speakers are invited to address the club and to discuss with the members general topics pertaining to chemistry.

The Stockbridge Club is an organization of students specially interested in practical agriculture, horticulture and floriculture. Regular meetings are addressed by outside speakers, and members present papers and engage in discussions.

The English Conference, meeting once a month or oftener, is composed of the instructors in the department of English and the students who are enrolled in elective English.

A seminar for juniors and seniors is conducted by the division of agriculture. The division of horticulture likewise conducts conferences or seminars.

An entomological club and a zoölogical club are also maintained by those specially interested in these departments of college work.

Honors and Awards — 1908.

Prize Awards.

The Grinnell Agricultural Prize. — To those members of the senior class who produce the best and second best examinations, oral and written, in theoretical agriculture. First prize, $40, to John Daniel; second prize, $20, to Clifford Dolan.

J. W. D. French Prize in Arboriculture. — To the writer of the best essay on the street trees of Amherst. One prize, $25, to Charles S. Putnam.

Hills Botanical Prizes. — For the best general herbarium, $15, to Laruentsius D. Larsen. For the best collection of Massachusetts trees and shrubs, $10, to Stearnes L. Davenport. For the best collection of Massachusetts woods, $10, to Winthrop A. Cummings.

Burnham Prizes in English. — To freshmen, for excellence in public declamation: first prize, $25, to Allyn P. Bursley; second prize, $20, to Herbert J. Baker; honorable mention, Herbert W. Blaney. To sophomores, for excellence in competitive essay writing: first prize, $20, no award; second prize, $10, to Henry T. Cowles; third prize, $5, to Samuel W. Mendum.

Flint Prizes in English. — To members of the junior class who produce the best and second best orations: first prize, $30, to Richard C. Potter; second prize, $20, to Charles H. White; honorable mention, Marcus T. Smulyan.

Entomological Prize. — Given by graduates of the college working in entomology to the two members of the senior class taking that subject who have most fully satisfied certain requirements of work indicated by the donors. First prize, $20, to Carlton C. Gowdey; second prize, $10, to James A. Hyslop.

The Western Alumni Association Prize. — To that member of the sophomore class who, during his two years in college, has shown the greatest improvement in scholarship, character and example. $25, to Frank T. Haynes.

Military Honors.

The following cadets, members of the senior class, were reported to the Adjutant-General of the United States army and to the Adjutant-General of Massachusetts as showing special aptitude for military service: John Albert Anderson, Chester Socrates Gillett, Kenneth Edward Gillett, Edwin Daniels Philbrick, William Franklin Turner, Roland Hale Verbeck, Hermon Temple Wheeler, Raymond Dean Whitmarsh, Samuel Judd Wright.

DEGREES CONFERRED AND ROLL OF STUDENTS.

Degrees Conferred — 1908.

Doctor of Philosophy.

Franklin, Henry James, Bernardston. B.S., Massachusetts Agricultural College, 1903.

Master of Science.

Shaw, Jacob Kingsley, North Amherst. B.S., University of Vermont, 1899.

Total, 2.

Bachelor of Science (B.Sc.).

Allen, Charles Francis,	Worcester.
Alley, Harold Edward,	Gloucester.
Anderson, John Albert,	North Brookfield.
Anderson, Kenneth French,	Roslindale.
Bailey, Ernest Winfield,	Worcester.
Bangs, Bradley Wheelock,	Amherst.
Barry, Thomas Addis,	Amherst.
Bartholomew, Persis,	Melrose Highlands.
Bates, Carleton,	Salem.
Chapman, Lloyd Warren,	Pepperell.
Chase, Henry Clinton,	Swampscott.
Clark, Orton Loring,	Malden.
Cobb, George Robert,	Amherst.
Coleman, William John,	Natick.
Cummings, Winthrop Atherton,	Bondsville.
Cutting, Leroy Edward,	Amherst.
Daniel, John,	Osterville.
Davenport, Stearnes Lothrop,	North Grafton.
Davis, Paul Augustin,	Lowell.
Dolan, Clifford,	Hudson.
Eastman, Perley Monroe,	Townsend.
Edwards, Frank Laurence,	Somerville.
Farley, Arthur James,	Waltham.
Farrar, Parke Warren,	Springfield.
Flint, Clifton Leroy,	Amesbury.
Gillett, Chester Socrates,	Southwick.
Gillett, Kenneth Edward,	Southwick.
Gowdey, Carlton Craig,	*Bridgetown, Barbados.*
Hayes, Herbert Kendall,	*North Granby, Conn.*

Howe, William Llewellyn,	Marlborough.
Hutchings, Frank Farley,	Amherst.
Hyslop, James Augustus,	*Rutherford, N. J.*
Jackson, Raymond Hobart,	Amherst.
Jennison, Harry Milliken,	Millbury.
Johnson, Frederick Andrew,	Westford.
Jones, Thomas Henry,	Easton.
Larned, Adelbert Joseph,	Amherst.
Larsen, Lars David,	*Bridgeport, Conn.*
Liang, Lai-Kwei,	*Tientsin, China.*
Miller, Danforth Parker,	Worcester.
Paige, George,	Amherst.
Parker, John Robert,	*Poquonock, Conn.*
Philbrick, Edwin Daniels,	Somerville.
Reed, Horace Bigelow,	Worcester.
Regan, William Swift,	Northampton.
Sawyer, William Francis,	Sterling.
Shattuck, Leroy Altus,	Pepperell.
Thurston, Frank Eugene,	Worcester.
Turner, Olive May,	Amherst.
Turner, William Franklin,	Reading.
Verbeck, Roland Hale,	Malden.
Warner, Theoren Levi,	Sunderland.
Waugh, Thomas Francis,	Worcester.
Wellington, Joseph Worcester,	Waltham.
Wheeler, Hermon Temple,	Lincoln.
Whiting, Albert Lemuel,	Stoughton.
Whitmarsh, Raymond Dean,	Amherst.
Wright, Samuel Judd,	South Sudbury.

Total, 58.

ROLL OF STUDENTS.

GRADUATE STUDENTS. — CANDIDATES FOR A DEGREE.

Bouquet, Arthur George Bristol, B.S., Oregon Agricultural College, 1906.	*Purley, Eng.*,	9 Fearing Street.
Bourne, Arthur Israel, A.B., Dartmouth College, 1907.	*Kensington, N. H.*,	82 Pleasant Street.
Burrell, Orange Bennett, B.S., Michigan Agricultural College, 1905.	*South Haven, Mich.*,	– –
Chapman, George Henry, B.Sc., Massachusetts Agricultural College, 1907.	*Wallingford, Conn.*,	15 Amity Street.
Davis, Irving Gilman, A.B., Bates College, 1906.	*Auburn, Me.*,	24 North College.
Holland, Edward Bertram, M.Sc., Massachusetts Agricultural College, 1898.	Amherst,	28 North Prospect Street.
Hooker, Charles Worcester, A.B., Amherst College, 1906.	Amherst,	5 North East Street.
Jennison, Harry Milliken, B.Sc., Massachusetts Agricultural College, 1908.	Auburn,	66 Pleasant Street.
Johnson, Frederick Andrew, B.Sc., Massachusetts Agricultural College, 1908.	Graniteville,	84 Pleasant Street.
Regan, William Swift, B.Sc., Massachusetts Agricultural College, 1908.	Northampton,	84 Pleasant Street.
Smith, Philip Henry, B.Sc., Massachusetts Agricultural College, 1897.	Amherst,	102 Main Street
Summers, John Nicholas, B.Sc., Massachusetts Agricultural College, 1907.	Campello,	Insectary.
Thurston, Frank Eugene, B.Sc., Massachusetts Agricultural College, 1908.	Worcester,	66 Pleasant Street.
Whitmarsh, Raymond Dean, B.Sc., Massachusetts Agricultural College, 1908.	Amherst,	120 Pleasant Street.

Total, 14.

SPECIAL STUDENTS. — NOT CANDIDATES FOR A DEGREE.

Nagai, Isaburo,	*Tokyo, Japan*,	120 Pleasant Street.

Total, 1.

SENIOR CLASS.

Alger, Paul Edgar,	Reading,	Brooks Farm.
Barlow, Waldo Darius,[1]	Amherst,	7 Northampton Road.
Barnes, Benjamin Franklin, Jr.,	Haverhill,	Theta Phi House.
Bartlett, Oscar Christopher,	Westhampton,	Mr. Goldberg's.
Briggs, Orwell Burlton,[1]	Egremont,	82 Pleasant Street.
Brown, George Murray, Jr.,	Cambridge,	4 South College.
Caffrey, Donald John,[1]	Gardner,	West Experiment Station.
Cardin, Patricio Pennaradonda,	*Artemesia, Cuba*,	7 South College.
Chase, Edward Irving,[1]	Somerville,	30 North Prospect Street.
Codding, George Melvin,	Taunton,	17 South College.
Corbett, Lamert Seymour,	Jamaica Plain,	6 South College.
Crosby, Harold Parsons,	Lenox,	12 South College.
Crossman, Samuel Sutton,	Needham,	11 South College.

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[1] Work incomplete.

Curran, David Aloysius,	Marlborough,	North Pleasant Street.
Cutler, Homer,	Westborough,	West Experiment Station.
Fulton, Gordon Russell,[1]	Lynn,	West Experiment Station.
Geer, Myron Francis,	Springfield,	44 Pleasant Street.
Geer, Wayne Emory,[1]	Springfield,	44 Pleasant Street.
Hathaway, Elmer Francis,	Cambridge,	Kappa Sigma House.
Hsieh, En-Lung,	*Tientsin, China,*	6 Maple Street.
Hubbard, Arthur Ward,	Sunderland,	5 South College.
Ide, Warren Leroy,	Dudley,	9 North College.
Ingalls, Dorsey Fisher,	Cheshire,	5 South College.
Jen, Huan,	*Tientsin, China,*	31 East Pleasant Street.
Knight, Harry Orrison,	Gardner,	96 Pleasant Street.
Lindblad, Rockwood Chester,	North Grafton,	20 South College.
Lull, Robert Delano,[1]	*Windsor, Vt.,*	– –
MacGown, Guy Ernestus,	*South Britain, Conn.,*	West Experiment Station.
Monahan, James Valentine,	South Framingham,	East Pleasant Street.
Neale, Harold Johnson,	Worcester,	9 South College.
Noble, Harold Gordon,	Springfield,	20 South College.
Noyes, John,	Roslindale,	Wilder Hall.
O'Grady, James Raphael,	Holliston,	8 South College.
Oliver, John Thomas,	Dorchester,	14 Kellogg Avenue.
Phelps, Harold Dwight,	West Springfield,	Plant House.
Potter, Richard Chute,	Concord,	11 South College.
Putnam, Charles Sumner,	Princeton,	13 East Pleasant Street.
Sexton, George Francis,	Worcester,	Walker's House.
Smulyan, Marcus Thomas,	*New York, N. Y.,*	West Experiment Station.
Thompson, Myron Wood,	Halifax,	18 South College.
Thomson, Jared Brewer,	Monterey,	25 North College.
Turner, Henry William,[1]	*Trinidad, Cuba,*	9 South College.
Warner, Frederick Chester,	Sunderland,	6 South College.
Waters, Theodore Charles,	*Rocky Hill, Conn.,*	French Hall.
Webb, Charles Russell,	Worcester,	10 South College.
Whaley, James Sidney,	*East Orange, N. J.,*	12 East Pleasant Street.
White, Charles Howard,[1]	*Providence, R. I.,*	4 South College.
White, Herbert Linwood,	*Evansville, Ind.,*	Cutler's House.
Willis, Luther George,[1]	Melrose Highlands,	Mr. Walsh's.
Wilson, Frank Herbert, Jr.,	Nahant,	12 South College

Total, 50.

JUNIOR CLASS.

Allen, Rodolphus Harold,[1]	Fall River	Kappa Sigma House.
Annis, Ross Evered,[1]	Natick,	116 Pleasant Street.
Armstrong, Robert Pierson,[1]	*Rutherford, N. J.,*	26 North College.
Bailey, Dexter Edward,	Tewksbury,	88 Pleasant Street.
Bailey, Justus Conant,	Wareham,	88 Pleasant Street.
Beeman, Francis Stone,	Amherst,	86 Main Street.
Blaney, Jonathan Phillips,[1]	Swampscott,	22 North College.
Brandt, Louis,	Everett,	Clark Hall.
Brooks, Henry Alvan,	*Cleveland, O.,*	16 South College.
Brooks, Sumner Cushing,	Amherst,	Plant House Ground.
Brown, Louis Carmel,	Bridgewater,	28 North College.
Burke, Edward Joseph,[1]	Holyoke,	9 South College.
Clarke, Walter Roe,	*Milton-on-Hudson, N. Y.,*	1 South College.
Cloues, William Arthur,[1]	*Warner, N. H.,*	7 South College.
Cowles, Henry Trask,	Worcester,	88 Pleasant Street.
Damon, Edward Farnham,[1]	Concord Junction,	18 South College.
Dickinson, Lawrence S.,	Amherst,	Plant House Grounds.
Eddy, Roger Sherman,	Dorchester,	116 Pleasant Street.
Everson, John Nelson,	Hanover,	2 South College.
Fisk, Raymond John,	Stoneham,	88 Pleasant Street.
Folsom, Josiah Chase,	Billerica,	College Store.
Francis, Henry Russell,[1]	Dennisport,	10 North College.

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[1] Work incomplete.

French, Horace Wells,	*Pawtucket, R. I.*,	15 South College.
Haynes, Frank Tuttle,	Sturbridge,	28 North College.
Hazen, Myron Smith,	Springfield,	Veterinary Laboratory.
Holland, Arthur Witt,	Shrewsbury,	24 North College.
Hosmer, Charles Irwin,	Turners Falls,	8 South College.
Johnson, William Clarence,	South Framingham,	10 North College.
Leonard, William Edward,[1]	Belmont,	22 North College.
McLaine, Leonard Septimus,	*New York, N. Y.*,	1 South College.
Mendum, Samuel Weis,	Roxbury,	88 Pleasant Street.
Nickless, Fred Parker,[1]	Billerica,	College Store.
Oertel, Charles Andrew,	South Hadley Falls,	South Hadley Falls.
Partridge, Frank Herbert,	Cambridge,	Clark Hall.
Paulsen, George,[1]	*New York, N. Y.*,	2 South College.
Prouty, Frank Alvin,[1]	Worcester,	Snell Street.
Rockwood, Albert Fletcher,[1]	Concord,	17 South College.
Roy, Goldie Calista,[1]	Watertown,	97 Pleasant Street.
Schermerhorn, Lyman Gibbs,[1]	*Kingston, R. I.*,	5 North College.
Shamiæ, George Mansour,	*Damascus, Syria*,	Old Creamery.
Thomas, Frank Lincoln,	Athol,	21 North College.
Titus, Willard McCready,[1]	New Braintree,	16 South College.
Turner, Edward Harrison,[1]	Reading,	Plant House.
Urban, Otto Velorous Taft,	Upton,	Kappa Sigma House.
Vinton, George Newton,[1]	Sturbridge,	Thompson House.
Waldron, Ralph Augustus,[1]	Hyde Park,	East Experiment Station.
Wallace, William Newton,[1]	Amherst,	6 Phillips Street.

Total, 47.

SOPHOMORE CLASS.

Adams, James Fowler,[1]	Melrose,	5 North College.
Allen, Park West,	Westfield,	14 South College.
Armstrong, Ralph Henry,[1]	Holyoke,	75 Pleasant Street.
Baker, Herbert Jonathan,	*Selbyville, Del.*,	Kappa Sigma House.
Barrows, Raymond Corbin,	*Stafford Springs, Conn.*,	E. H. Forristall.
Bean, Thomas Webster,	South Hadley Falls,	South Hadley Falls.
Bentley, Arnold Gordon,	Hyde Park,	3 McClellan Street.
Blaney, Herbert Wardwell,	Swampscott,	87 Pleasant Street.
Brown, Edgar Morton,	Springfield,	9 North College.
Brown, Irving Clarence,	Natick,	96 Pleasant Street.
Burnham, Arthur James,	Holyoke,	75 Pleasant Street.
Burseley, Allyn Parker,	West Barnstable,	88 Pleasant Street.
Conant, Arthur Theodore,	Sunderland,	Sunderland,
Damon, Charles Murray,	Haydenville,	Experiment Station.
Davis, Egbert Norton,	South Framingham,	77 Pleasant Street.
Davis, Irving Wilder,	Lowell,	Insectary.
Drury, Harold Blake,	Athol,	23 North College.
Dudley, John Edward,[1]	Newton Center,	21 North College.
Gilgore, Irvin Craig,	*Schenectady, N. Y.*,	3 McClellan Street.
Henry, Willard Francis,	Hopedale,	7 North College.
Hill, Nathaniel Herbert,	*Glenmoore, N. J.*,	14 South College.
Howe, Harold Hosmer,[1]	Springfield,	Kappa Sigma House.
Huang, Chen-Hua,	*Tientsin, China*,	75 Pleasant Street.
Jenks, Albert Roscoe,	Three Rivers,	Plant House.
Johnson, Leonard Matthews,	Easthampton,	27 North College.
Labouteley, Gaston Edward,	Lynn,	Kappa Sigma House.
Larrabee, Edward Arthur,	Winthrop,	Clark Hall.
Lodge, Charles Albert,[1]	Manchester,	87 Pleasant Street.
McLaughlin, Frederick Adams,[1]	Lee,	Kappa Sigma House.
McNayr, Rupert Stanley,	Rockland,	13 South College.
McGraw, Frank Dobson,	Fall River,	North College.
Morse, Henry Bowditch,	Salem,	Kappa Sigma House.
Nielsen, Gustaf Arnold,[1]	West Newton,	96 Pleasant Street.

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[1] Work incomplete.

Nickerson, George Payne,	Amherst,	East Experiment Station.
Ostrolenk, Bernhard,	*Gloversville, N. Y.*,	23 North College.
Parsons, Samuel Reynolds,	North Amherst,	North Amherst.
Patch, Roland Harrison,	Wenham,	88 Pleasant Street.
Pauly, Herman Alfred,	Somerville,	Nash Hall.
Pickard, Percy William,	Hopedale,	7 North College.
Piper, Ralph Waldo,	South Acton,	116 Pleasant Street.
Prouty, Philip Herman,	Shrewsbury,	27 North College.
Racicot, Philias Armand,[1]	Lowell,	South College.
Robinson, Ralph Cushing,	Boston,	9 Fearing Street.
Sharpe, Arthur Harris,	Saxonville,	Kappa Sigma House.
Smith, Clarence Albert,	Northampton,	Forristall's.
Smith, Raymond Goodale,[1]	Lynn,	3 Fearing Street.
Stevenson, Lomas Oswald,	*Hackensack, N. J.*,	87 Pleasant Street.
Warren, Edward Irving,[1]	Leicester,	82 Pleasant Street.
Whitney, Raymond Lee,	Brockton,	21 North College.
Willard, Harold Francis,	Leominster,	44 Pleasant Street,
Winn, Ervin Lawrence,[1]	Holden,	96 Pleasant Street.

Total, 54.

Freshman Class.

Ackerman, Arthur John,	Worcester,	82 Pleasant Street.
Baird, Everett Jamieson,	Clinton,	19 Fearing Street.
Beers, Rowland Trowbridge,	Billerica,	Experiment Station.
Bent, William Richard,	Marlborough,	Brooks Farm.
Birdsall, Webster Jennings,	*Otego, N. Y.*,	58 Pleasant Street.
Bodfish, Edward Hill,	West Barnstable,	6 Allen Street.
Boland, Eric Nicholas,	South Boston,	9 Fearing Street.
Brett, Alden Charles,	North Abington,	Prof. W. P. Brook's.
Brown, Merle Raymond,	Greenwich Village,	60 College Street.
Burr, Frederick Huntington,	Worthington,	Fearing Street (Miss Sargent's).
Cabot, George Dwight,	Winchester,	79 Pleasant Street.
Caldwell, Lawrence Sanborn,	Lynn,	3 McClellan Street.
Campbell, Clare Avery,	Boston,	8 Kellogg Aveune.
Carpenter, Jesse, Jr.,	Attleborough,	Kappa Sigma House.
Castle, Fred Arlo,	*Kansas City, Mo.*,	116 Pleasant Street.
Clapp, Raymond Kingsley,	Westhampton,	Mr. E. H. Forristall's.
Cohen, Harold,	Somerville,	96 Pleasant Street.
Covill, Joseph Warren,	West Roxbury,	9 Fearing Street.
Curran, Daniel Joseph,	Marlborough,	East Pleasant Street.
Daniel, Edward Stephen Coen,	Osterville,	6 Allen Street.
Dee, John Francis,	Worcester,	75 Pleasant Street.
Deming, Winfred Griswold,	*Wethersfield, Conn.*,	75 Pleasant Street.
Dodge, Albert Wesley,	Wenham,	Mr. Walker's.
Durling, Edgar Vincent,	*Brooklyn, N. Y.*,	60 Pleasant Street.
Eastman, Edward Baxter, Jr.,	North Amherst,	Leverett Street.
Eisenhaure, John Louis,	North Reading,	Thompson House.
Ells, Gordon Waterman,	Cambridge,	44 Triangle Street.
Fagerstrom, Leon Emanuel,	Worcester,	82 Pleasant Street.
Finnegan, John Thomas,	Forest Hills,	66 Pleasant Street.
Fisherdick, Warren Francis,	Amherst,	26 South Pleasant Street.
Fitts, Frank Orus,	North Amherst,	North Amherst.
Fitzgerald, John Joseph,	Holyoke,	96 Pleasant Street.
Folger, Ernest Maynard,	Brockton,	17 Fearing Street.
Fowler, George Scott,	Wayland,	44 Pleasant Street.
Frost, John Newton,	Natick,	77 Pleasant Street.
Gallagher, James Andrew,	North Wilmington,	44 Triangle Street.
Gaskill, Lewis Warren,	Hopedale,	Mr. Goldberg's.
Gelinas, Louis Edmund,	North Adams,	Brooks Farm.

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[1] Work incomplete.

Gibbs, Robert Morey,	Chester,	Brooks Farm.
Gibson, Lester Earle,	Melrose,	44 Triangle Street.
Gray, Frank Leonard,	East Boston,	19 Fearing Street.
Hall, Ralph Sawyer,	Sturbridge,	82 Pleasant Street.
Hamilton, Percy,	*Portland, Me.*,	5 McClellan Street.
Harlow, Joseph Alvin,	Turners Falls,	75 Pleasant Street.
Heald, Jay Morrill,	Watertown,	3 McClellan Street.
Hemenway, Thomas,	Winchester,	79 Pleasant Street.
Hills, Frank Burrows,	Bernardston,	77 Pleasant Street.
Hickey, Francis Benedict,	Brockton,	5 McClellan Street.
Holland, Henry Lucius,	Amherst,	28 North Prospect Street.
Hutchings, Herbert Colby,	South Amherst,	Mr. E. H. Forristall's.
Kingsbury, Arthur French,	Medfield,	Mr. E. H. Forristall's.
Lamson, Robert Ward,	Amherst,	109 Main Street.
Lloyd, Edward Russell,	Boston,	6 Phillips Street.
Lowry, Quincy Shaw,	Canton,	120 Pleasant Street.
Lundgren, Arthur Robert,	Orange,	88 Pleasant Street.
Martin, James Francis,	Amherst,	19 South East Street.
Maxon, Donald Charles,	*Elkhart, Ind.*,	25 Sunset Avenue.
McGarr, Thomas Anthony,	Worcester,	31 East Pleasant Street.
McLean, John Robert,	Medford,	60 Pleasant Street.
Merkle, George Edward,	Amherst,	East Street.
Merrill, Fred Sawyer,	Danvers,	96 Pleasant Street.
Messer, Allen Irving,	Pittsfield,	– –
Moreau, Theodore Joseph,	Turners Falls,	75 Pleasant Street.
Mueller, Alfred Frederick,	Jamaica Plain,	5 Fearing Street.
Norris, Edward Jaffray,	Somerville,	96 Pleasant Street.
Noyes, Harry Alfred,	Marlborough,	120 Pleasant Street.
O'Flynn, George Bernard,	Worcester,	75 Pleasant Street.
Oppel, Eugene Irving,	*Little Falls, N. Y.*,	82 Pleasant Street.
Parker, Ralph Robinson,	Malden,	27 North College.
Pearson, Charles Cornish,	Arlington,	96 Pleasant Street.
Peckham, Curtis,	Clifford,	5 Fearing Street.
Philbrick, William Edwin,	Taunton,	96 Pleasant Street.
Pierpont, John Edwards,	Williamsburg,	79 Pleasant Street.
Pratt, Marshall Cotting,	Lowell,	120 Pleasant Street.
Puffer, Stephen Perry,	North Amherst,	North Amherst.
Raymond, Arthur Nathaniel,	Leominster,	120 Pleasant Street.
Reed, Robert Edward,	Abington,	88 Pleasant Street.
Roberts, Clarence Dwight,	*New Haven, Conn.*,	82 Pleasant Street.
Robinson, Earle Johnson,	Hingham,	116 Pleasant Street.
Rockwood, Lawrence Peck,	*Waterbury, Conn.*,	116 Pleasant Street.
Sanctuary, William Crocker,	Amherst,	147 South Pleasant Street.
Sellew, Lewis Raymond,	Natick,	77 Pleasant Street.
Shaw, Ezra Ingram,	Amherst,	8 Spaulding Street.
Smith, Harrison Edward,	Medford,	27 North College.
Southwick, Benjamin Gilbert,	Buckland,	82 Pleasant Street.
Springer, Isaac,	Boston,	5 Fearing Street.
Stack, Herbert James,	Amherst,	East Pleasant Street.
Tong, Ying Hee,	*Tientsin, China*,	– –
Torrey, Ray Ethan,	North Leverett,	East Pleasant Street.
Tower, Daniel Gordon,	Roxbury,	79 Pleasant Street.
Tucker, John William,	Worcester,	Brooks Farm.
Tupper, George Wilbur,	Roxbury,	96 Pleasant Street.
Turner, Austin Ralph,	Walpole,	75 Pleasant Street.
Turner, Howard Archibald,	Dorchester,	East Pleasant Street and Lover's Lane.
Wales, Robert Webster,	North Abington,	Brooks Farm.
Walker, Herman Chester,	Marlborough,	Brooks Farm.
Warner, Roger Andrew,	Sunderland,	Mr. E. H. Forristall's.
Weaver, William Jack,	Alandar,	6 Allen Street.
Whitney, Charles Edward,	Wakefield,	Brooks Farm.
Wilbur, Emory Sherman,	East Wareham,	101 Pleasant Street.
Wilde, Earle Irving,	Taunton,	Kappa Sigma House.

Williams, Edward Roger,	Concord Junction,	116 Pleasant Street.
Williams, Silas,	Fall River,	Mr. R. J. Goldberg's.
Wood, Howard Holmes,	Shelburne Falls,	10 Allen Street,
Young, Edward Burnham,	Dorchester,	8 Kellogg Avenue.

Total, 116.

WINTER COURSE STUDENTS — 1909.

Adams, Alpheus Rufus,	Northborough.
Adams, Arthur Simonds,	Shrewsbury.
Adams, Fred Carlton,	Amherst.
Aldrich, Leon Henry,	Belchertown.
Allen, James Beatty,	Haverhill.
Allen, Ralph Owen,	West Brookfield.
Avery, Lester Ellsworth,	Plymouth.
Badger, Ralph Alvin,	*Randolph, Vt.*
Barstow, Harold Dunbar,	South Hadley.
Bayer, Harry,	*New York, N. Y.*
Beaubien, Arthur,	Turners Falls.
Belches, Edward Faxon,	South Framingham.
Bibber, John Carleton,	*Freeport, Me.*
Bodette, Eugene,	*Vergennes, Vt.*
Brown, Leland Elliott,	Deerfield.
Clarke, Chester Thomas,	Reading.
Cole, Frederick William,	Greenbush.
Copeland, Harvey Leland,	Colrain.
Creswell, Albert,	West Brookfield.
Davidson, Wilbur King,	West Millbury.
Derr, Paul Ambrose,	*Williamsport, Pa.*
Drummery, Dennis Edward,	Marlborough.
Dustin, Otis Ellsworth,	Monson.
Felch, George Alfred,	Ayer.
Fennely, N. J.,	Boston.
Forbes, Ralph Monroe,	Worcester.
Gallagher, Hugh John,	New Lebanon.
Galarnean, Arthur Leopold,	*North Bay, Ont.*
Gaskill, Clayton Wood,	South Milford.
Headle, Everett Waldo,	Bolton.
Hemenway, Lee,	*Bridport, Vt.*
Hepburn, William Kirkland,	Sunderland.
Holcomb, Tudor Frederick,	West Granby.
Howard, Everett Clapp,	Belchertown.
Imlay, William Sylvester,	*Zanesville, O.*
Johnson, Esther Marguerite,	Cambridge.
Keith, Harold Newell,	West Boylston.
Larsen, Augustus Francis,	Pride's Crossing.
Lyon, Lawrence Whitman,	Abington.
MacDonald, Charles Grant,	Medway.
McGauvran, Lizzie,	Fisherville.
McGonigle, Cornelius James,	Worcester.
McMaster, Percy Elmer,	*New York, N. Y.*

Midgeley, Frank Leonard,	Worcester.
Nelson, David Arvid,	Avon.
Nevius, Richmond,	Rochester.
Nye, Edmund Russell,	Russell.
Ordway, Carroll Colby,	West Newbury.
Osborn, William,	*Cos Cob, Conn.*
Perrin, Emmet Mark Fred,	*Potsdam, N. Y.*
Phelps, Arthur Augustus,	Southborough.
Phillips, Emerson Orin,	Huntington.
Richards, George Frank,	Williamsburg.
Schmitz, Eugene Alfonso Ricardo,	Danvers.
Smith, William Henry,	Great Barrington.
Stone, Daniel Earle,	Attleborough.
Sutcliffe, John Rowell,	North Billerica.
Tanner, Fred William,	North Adams.
Thayer, Robert Eugene,	Franklin.
Tilden, J. Alexander,	*Cleveland, O.*
Thompson, Charles Wilfred,	Attleborough.
Turner, Harvey Gay,	North Reading.
Ware, William Crosby,	Concord.
Warfield, Arthur Henry, Jr.,	West Brookfield.
Welch, Harlow,	Boston.
Welch, Wilbert Eben, Jr.,	Boston.
Wilcox, Lauriston Anson,	*North Pownal, Vt.*
Young, Earle Leonard,	South Hadley Center.

Total, 66.

Summer School Students — 1908.

Adams, Lena R.,	North Brookfield.
Allison, Catherine D.,	Northampton.
Ammidown, Eva B.,	Roslindale.
Ayer, Elizabeth E.,	*Saybrook, Conn.*
Barrett, Florence,	Cambridge.
Barrett, Mrs. Sarah,	Cambridge.
Barry, Mary,	Amherst.
Barry, Veronica,	Amherst.
Barton, Alice M.,	West Roxbury.
Bates, Mabel L.,	East Wareham.
Belcher, S. Elisabeth,	Worcester.
Best, Fannie E.,	*New Dorp, N. Y.*
Billings, Mrs. G. A.,	*Washington, D. C.*
Breaker, Carl H.,	Northampton.
Brooks, Laura J.,	Stoneham.
Buckley, Emma,	Worcester.
Burgess, Louisa W.,	Dorchester Center.
Butterfield, Annie J.,	Worcester.
Callahan, Mary J.,	Worcester.
Carley, Lilian M.,	*New York City.*
Chace, S. Howard,	Lowell.

Chase, Alice C.,	Lynn.
Cheney, Hazel Chase,	Amherst.
Churbuck, Bessie L.,	East Wareham.
Church, Helen L.,	Shelburne Falls.
Churchill, Abby P.,	Fitchburg.
Clark, Eva H.,	Sandwich.
Clark, Orton L.,	Amherst.
Clay, Charles L.,	Harvard.
Clough, Jennie S.,	Cambridge.
Cochran, Agnes M.,	South Boston.
Cooney, Helen T.,	Lawrence.
Cotta, Florence L.,	Worcester.
Cram, Julia H.,	Brookline.
Curley, Thomas F.,	Waltham.
Currier, Frances W.,	Brighton.
Davis, Carrie I.,	Taunton.
Davis, Florence I.,	Bridgewater.
Donelson, Lura,	Greenfield.
Dorph, Bernhard,	Amherst.
Dorr, Clara L.,	Dorchester.
Draper, Lizette M.,	Worcester.
Dunham, Annie D.,	Island Creek.
Dupuy, Helen A.,	*Chicago, Ill.*
Earle, Elizabeth,	*New Haven, Conn.*
Eaton, Luella,	Needham Heights.
Farwell, Minnie G.,	Walpole.
Fay, Louise,	Waltham.
Fletcher, Florence A.,	Wakefield.
French, Mrs. Clara Graves,	*Weston, Ore.*
Gavin, Agnes M.,	Roxbury.
Gilbert, Pauline,	Amherst.
Gooduow, Edna M.,	Amherst.
Goodwin, Rev. Sherman,	*South Royalton, Vt.*
Gracey, F. M.,	Amherst.
Granger, Helen,	Cambridge.
Graves, Bessie M.,	Southampton.
Greene, Rev. M. N.,	Amherst.
Griffeth, Mary A.,	East Wareham.
Gustin, Rev. B. F.,	North Amherst.
Haskell, Mabelle W.,	Lynn.
Haskell, Sarah E.,	Medway.
Hastings, George H.,	Fitchburg.
Haynes, Julia A.,	Hyannis.
Heath, Chester B.,	Dedham.
Heatly, Elisabeth,	Fall River.
Hoagland, Rev. N. S.,	Tyngsborough.
Hopkins, Elizabeth,	Winchester.
Howard, Alice M.,	Taunton.
Howard, Annie G.,	Taunton.
Howes, A. F.,	Sheffield.

Howland, Florence B.,	Somerville.
Howland, Gertrude S.,	Revere.
Howland, Mary A.,	Sandwich.
Hutchings, F. F.,	Amherst.
Ingalls, Maud,	Cheshire.
Ingalls, May D.,	Cheshire.
Irwin, Grace W.,	Sandwich.
Jason, May,	New Bedford.
Kendrick, Jean,	Amherst.
Killion, Anna L.,	Roxbury.
Kilmer, Sarah E.,	Boston.
Lamphier, Annie J.,	North Adams.
Larkin, Martha M.,	Lynn.
Lewis, Winifred,	Rochester.
Lilley, Alice,	Fairhaven.
Lillis, Marguerite,	Roxbury.
Lovejoy, Blanche S.,	Haverhill.
Marvin, Donald,	*New London, Conn.*
Marvin, Gerald,	*New London, Conn.*
Marvin, Mrs. Walter,	*New London, Conn.*
Marvin, Rev. Walter,	*New London, Conn.*
Mason, Isadore H.,	Gardner.
Mattson, Mrs. W. F.,	Brookline.
Mattson, W. Rhoades,	Brookline.
Mead, Ella,	*Brooklyn, N. Y.*
Meggett, Marshall M.,	Brookline.
Miller, Susie T.,	Brockton.
Mitchell, Margaret D.,	Charlestown.
Mitchell, Mary C.,	Charlestown.
Morgan, Agnes,	Amherst.
Moulton, Sarah H.,	West Lynn.
Muirhead, Rev. A. Stanley,	East Bridgewater.
Murray, Anna M.,	Worcester.
Murray, E. Frances,	Cambridge.
Murray, Florence H.,	Cambridge.
Murray, Rupert H.,	*New Rochelle, N. Y.*
Negus, Ruth,	Fall River.
Nelligan, K. M.,	Amherst.
Nevius, Richmond,	Rochester.
New, Mary A.,	Amherst.
Newell, A. E.,	South Boston.
Nicholson, Madge C.,	Wareham.
Nishimiya, Masutaro,	Amherst.
Oakley, Mary F.,	*Brooklyn, N. Y.*
Pardee, Rev. J. N.,	Bolton.
Parker, Agnes C.,	Uxbridge.
Parker, Winifred Lenore,	Holyoke.
Parkhurst, Dorothy,	Amherst.
Parsons, Sally,	Lynn.
Paul, Maria E.,	Lynn.

Paulsen, George W.,	*Tremont, New York City.*
Perkins, Emily,	Woburn.
Phalen, Mrs. Frank L.,	Fairhaven.
Phalen, Rev. Frank L.,	Fairhaven.
Pierpont, Rev. John,	Williamsburg.
Pond, E. W.,	Sheffield.
Post, Edna A.,	*Gilead, Conn.*
Post, Jessie L.,	*Gilead, Conn.*
Rich, Frank M.,	North Weymouth.
Robinson, Mrs. Alice M.,	South Boston.
Robinson, Mary B.,	Waltham.
Roehrs, Herman I.,	*New York City.*
Rossiter, Irmagarde,	*Hartford, Conn.*
Rowe, Mildred,	Amherst.
Roy, G. Calister,	Watertown.
Scott, Mary L.,	Worcester.
Seavey, Alma F.,	Natick.
Shipman, Julia,	Boston.
Shores, Iva,	Amherst.
Shumway, Ruby M.,	South Amherst.
Skerrett, Sarah V.,	Worcester.
Smith, Annie E.,	Springfield.
Smith, Hattie E.,	Wareham.
Stimson, Mrs. Helen M.,	Northampton.
Stone, Melville A.,	Reading.
Streeter, Lilla M.,	Millbury.
Sullivan, Esther F.,	Charlestown.
Swett, Lena S.,	*Burlington, Vt.*
Sylvester, Charles B.,	Haverhill.
Taylor, Rev. James D.,	Amherst.
Tierney, Margaret E.,	Lawrence.
Tierney, William A.,	Worcester.
Tobin, Ellen C.,	Lawrence.
Tufts, Mary I.,	Lynn.
Turner, Howard A.,	Amherst.
Verbeck, Roland H.,	Malden.
Waters, Mrs. F. P.,	*Rocky Hill, Conn.*
Waters, Rev. F. P.,	*Rocky Hill, Conn.*
Waugh, Dorothy,	Amherst.
Waugh, Thomas F.,	Worcester.
Weed, Susan M.,	*Wethersfield, Conn.*
Weston, Marion L.,	Roslindale.
Whitton, Jennie E.,	*Hazardville, Conn.*

Total, 166.

SUMMARY BY CLASSES.

Graduate students,	14	
Special students,	1	
Senior class,	50	
Junior class,	47	
Sophomore class,	54	
Freshman class,	116	
		282
Winter course,	66	
Summer school,	166	
		232
Total,		514

GEOGRAPHICAL SUMMARY.

	The College.	The Short Courses.
Connecticut,	7	15
Delaware,	1	–
District of Columbia,	–	1
Illinois,	–	1
Indiana,	2	–
Maine,	2	2
Massachusetts,	236	181
Michigan,	1	–
Missouri,	1	–
New Hampshire,	2	–
New Jersey,	4	–
New York,	11	13
Ohio,	1	4
Oregon,	–	1
Pennsylvania,	–	1
Rhode Island,	3	–
Vermont,	1	10
China,	4	–
Cuba,	2	–
England,	1	–
Japan,	1	–
Ontario,	1	1
Syria,	1	–
Totals,	282	232

ADDENDA.

I.

ABSTRACT OF THE ADMISSION REQUIREMENTS STATED IN THE CATALOGUE OF 1907–08.

The examinations in June and September, 1909, will be based on these requirements; but certificates will be accepted either on these or on the revised requirements already stated, as the applicant may elect.

Requirements.

The candidate to be at least sixteen years old, and to furnish testimonials proving good moral character.

The candidate to furnish an acceptable certificate or to pass an examination showing preparatory study in three groups of studies, as follows: —

Group I. Language.

Sub-group 1: English (required).
Sub-group 2: French or German (*one* required).

Group II. History and Civics.

Sub-group 1: United States history and civics (required).
Sub-group 2: History (elective; *one* required).
  (*a*) Ancient history.
  (*b*) Medieval and modern history.
  (*c*) English history.
  (*d*) General history.

Group III. Mathematics and Science.

Sub-group 1: Algebra, through quadratics (required).
Sub-group 2: Plane geometry (required).
Sub-group 3: Any *two* of the following (required): —
  (*a*) Chemistry.
  (*b*) Physiology.
  (*c*) Solid geometry.

Explanation of Requirements.

GROUP I. LANGUAGE. — In *English,* candidates must be able to meet the usual college requirements (as defined by the College Entrance Examination Board[1]) except that one calling for the detailed study of books under division *B* of the current list of recommended books. The college insists that applicants be able to interpret at sight unfamiliar prose and verse of medium difficulty, and that they be familiar with grammar. The examination will be based on the books here named; but if an applicant wishes to be examined upon others of those included in the standard list, he will be so examined, provided he notify the Department of English by June 1, 1909.

Books. — Shakspere's "Macbeth" and "The Merchant of Venice;" Milton's "Lycidas," "Comus," "L'Allegro" and "Il Penseroso;" Webster's "First Bunker Hill Oration," with either Burke's "Speech on Conciliation" or Washington's "Farewell Address;" Tennyson's "Gareth and Lynette," "Lancelot and Elaine," and "The Passing of Arthur;" Ruskin's "Sesame and Lilies;" Bunyan's "Pilgrim's Progress" (Part I.); Scott's "Quentin Durward;" either Macaulay's "Life of Johnson" or Carlyle's "Essay on Burns."

In *French* or *German,* candidates must offer one year of elementary work as defined in the requirements of the College Entrance Examination Board.[1]

GROUP II. HISTORY AND CIVICS. — Preparation in the subjects of Group II. will be satisfactory if made in accordance with the recommendations of the Committee of Seven of the American Historical Association, as outlined by the College Entrance Examination Board.[1] The examination will require comparisons and the use of judgment by the candidate rather than the mere use of memory.

GROUP III. MATHEMATICS AND OTHER SCIENCES. — It is strongly recommended that students preparing for entrance take the mathematical review offered in most high school courses.

Algebra. — Through the first twenty-three chapters of Wells's "College Algebra," or an equivalent. The student should be thoroughly drilled in the fundamental operations.

Plane Geometry. — All of plane geometry as given in Wells, or an equivalent.

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[1] Address sub-station 84, New York City.

Solid Geometry. — All of Wells's "Solid Geometry," or an equivalent.

Chemistry. — The following chapters in Newth's "Inorganic Chemistry" or Newell's "Descriptive Chemistry," or their equivalents: —

Newth — Part 1. Chapters I. to VII. inclusive.
Part 2. Chapters I. to VIII. inclusive.
Newell — Chapters I. to XII. inclusive.

Physiology. — The equivalent of Hough & Sedgwick's "The Human Mechanism." The examination is based on this book.

Certification.

Certificates must present at least 50 per cent. of the subjects required for entrance, and deficient subjects must be made up by examination upon entrance or within the first semester.

The certificate must come from a school approved (*a*) by the college, or (*b*) by the College Entrance Examination Boards, or else must be the usual credentials from the New York State Board of Regents. Blank forms will be furnished, but only to principals or superintendents.

II.

Alumni Associations and Class Secretaries.

Alumni Associations.

The Associate Alumni of the Massachusetts Agricultural College.
President, Austin Peters, '81, Boston, Mass.
Secretary, H. F. Tompson, '05, Amherst, Mass.

The Local Alumni Association of the Massachusetts Agricultural College.
President, Robert W. Lyman, '71, Northampton, Mass.
Secretary, A. C. Monahan, '00, Turners Falls, Mass.

The Alumni Club of Massachusetts.
President, F. W. Davis, '89, Roslindale, Mass.
Secretary, Newton Shultis, '96, Boston, Mass.

The Connecticut Valley Association of the Massachusetts Agricultural College Alumni.
President, Chas. A. Goodrich, '93, Hartford, Conn.
Secretary, Walter B. Hatch, '05, Hartford, Conn.

The Massachusetts Agricultural College Club of New York.
President, Chas. E. Lyman, '78, Middlefield, Conn.
Secretary, Dr. John A. Cutter, '82, 325 West Eighty-third Street, New York, N. Y.

The Massachusetts Agricultural Club of Washington, D. C.
President, C. S. Crocker, '89, 25 South Van Pelt Street, Philadelphia, Pa.
Secretary, F. D. Couden, '04, 1310 Columbia Road, Washington, D. C.

The Western Alumni Association of the Massachusetts Agricultural College.
President, A. B. Smith, '95, 544 Winnemac Avenue, Chicago, Ill.
Secretary, M. H. West, '03, 28 Lindon Court, Chicago, Ill.

Class Secretaries.

Class of	SECRETARY.	Secretary's address.
1871	E. E. Thompson,	Worcester, Mass.
1872	S. T. Maynard,	Northborough, Mass.
1873	C. Wellington,	Amherst, Mass.
1874	– –	– –
1875	M. Bunker,	Newton, Mass.
1876	C. Fred Deuel,	Amherst, Mass.
1877	– –	– –
1878	C. O. Lovell,	48 Summer Street, Boston, Mass.
1879	R. S. Swan,	Worcester, Mass.
1880	– –	– –
1881	J. L. Hills,	Burlington, Vt.
1882	G. D. Howe,	Bangor, Me.
1883	S. M. Holman,	Attleborough, Mass.
1884	L. Smith,	25 Mercantile Street, Worcester, Mass.
1885	E. W. Allen,	Washington, D. C.
1886	Dr. Winfield Ayres,	616 Madison Avenue, New York, N. Y.
1887	F. H. Fowler,	136 State House, Boston, Mass.
1888	H. C. Bliss,	Attleborough, Mass.
1889	C. S. Crocker,	25 South Van Pelt Street, Philadelphia, Pa.
1890	F. W. Mossman,	Westminster, Mass.
1891	W. A. Brown,	Greenfield, Mass.
1892	H. M. Thomson,	Amherst, Mass.
1893	F. A. Smith,	Ipswich, Mass.
1894	S. F. Howard,	Amherst, Mass.
1895	H. A. Ballou,	Barbadoes, W. I.
1896	– –	– –
1897	C. A. Peters,	Moscow, Idaho.
1898	S. W. Wiley,	15 South Gay Street, Baltimore, Md.
1899	D. A. Beaman,	Ponce, Porto Rico.
1900	E. K. Atkins,	Northampton, Mass.
1901	J. H. Chickering,	Dover, Mass
1902	H. L. Knight,	1731 T Street, Washington, D. C.
1903	G. D. Jones,	North Amherst, Mass.
1904	P. F. Staples,	North Grafton, Mass.
1905	P. F. Williams,	Milton, Mass.
1906	Richard Wellington,	Geneva, N. Y.
1907	G. H. Chapman,	Amherst, Mass.
1908	Jas. A. Hyslop,	205 D Street, Washington, D. C.

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The M. A. C. Bulletin

Vol. 1. No. 3. AMHERST, MASS. September, 1909

Campus and Chapel

Published six times a year by the Massachusetts
Agricultural College.

January, February, March, May, September, October.

Entered as second class matter at the post office, Amherst, Mass.

FACTS ABOUT THE MASSACHUSETTS AGRICULTURAL COLLEGE

1. Location is ideal.
2. Cost of an education there is moderate: $225.—$325. per year.
3. Training is broad and thorough.
4. Opportunities for men thus trained are attractive and varied.
5. It is now conceded that the agricultural vocations require a high order of talent and broad training.
6. Total enrolment for 1908 - 1909 was 524.
7. Four years' students of 1909 - 1910 number 313.
8. Number of four years' students has more than doubled in six years.
9. The campus contains 75 acres.
10. There are 15 college buildings exclusive of stables and dwelling houses.
11. The value of these buildings is estimated at over $355,000.
12. The value of their equipment is approximately $200,000.
13. The annual support from the State is over $115,000.
14. Special appropriations from the State in 1909 for buildings, repairs, land, etc., amounted to $158,500.
15. Faculty and Experiment Station officials number 57.

THE ANNUAL CATALOG IS PRINTED IN THE EARLY SPRING.

SEND FOR A COPY OF THE NEXT ISSUE.

Massachusetts Agricultural College Booklet

September, 1909.

The College
The Graduate School
The Short Courses
The Experiment Station

THIS booklet attempts briefly to indicate the work of the Massachusetts Agricultural College, and the possibilities which it offers to young men seeking an efficient technical training, particularly along agricultural and out of door lines of activity, both practical and scientific.

Anyone contemplating a college course is invited to send for a catalog giving complete information.

KENYON L. BUTTERFIELD, President.

AMHERST, MASS.

1909-College Calendar-1910

1909

September 13–14	Entrance Examinations
September 15, 9.30 A. M.	First Semester Begins
November 24, 1.00 P. M.	Thanksgiving Recess Begins
November 29, 1.00 P. M.	Thanksgiving Recess Ends
December 17, 6.00 P. M.	Winter Recess Begins

1910

January 3, 1.00 P. M.	Winter Recess Ends
January 4, 8.00 A. M.	Winter School Opens
February 7, 1.00 P. M.	Second Semester Begins
February 22	Holiday, Washington's Birthday
February 28 - March 11	Poultry Course
March 11	Winter School Closes
March 14–18	Farmers' Week
March 25, 6.00 P. M.	Spring Recess Begins
April 4, 1.00 P. M.	Spring Recess Ends
April 19	Holiday, Patriots' Day
May 25–June 8	Beekeeping Course
May 30	Holiday, Memorial Day
June 18–22	Commencement Exercises
June 23–24	Entrance Examinations
July 5	Summer School Opens (Four and Six Weeks)

THE value of a college education as a training for the truest citizenship is no longer doubted by the American people. Half a century ago the progressive educators began seriously to question whether the idea of the cultural education given in the oldest institutions of the country was the only idea to be followed in preparing young men to perform the greatest service in life, and if indeed some radically different form of education were not preferable and even necessary in training them for the callings of the great industrial world. The idea of technical schools was fostered and their founding encouraged. In the time of the Civil War, the United States Congress provided that in every state there might be established a technical institution in which, without excluding the "culture" courses, there might be taught Agriculture and the Mechanic Arts.

In this state, the instruction in the Mechanic Arts is separated from that in Agriculture and is provided by the Massachusetts Institute of Technology.

The Massachusetts Agricultural College was opened in 1867. Its chief purpose is to prepare men and women for the agricultural vocations. Broadly interpreted, this term includes not only the various practical pursuits, but also investigation in the sciences underlying the vast agricultural indus-

Haying

try, teaching in agricultural colleges and high schools, and business occupations which have to do with the processes of practical agriculture.

Though the agricultural vocations are the chief concern of the College, the courses afford a broad training in the allied sciences, and are so well balanced as to provide a splendid general education, without regard for future occupation.

Thus the work of the Agricultural College represents one phase of Industrial Education, the importance of which is now being so publicly acknowledgd by those in closest touch with the fundamental economic, social, and political problems of the country. This and other functions which the College is performing, make it worthy of the liberal support which it receives from the Federal and State Governments, and of the respect and consideration of any person planning the career either of himself or of another. The fact that in the last six years the number of students attending the College has more than doubled, indicates that the College and the work which it is doing, are coming to be regarded with constantly increasing favor and appreciation. Already the foundation is laid for a prominent and unique institution: one of which Massachusetts people may well be proud, both now and in future years.

An Approach to the College

The College in the Valley

Location

The location of the College is ideal. The grounds, including more than four hundred acres, lie just outside the village of Amherst. Amherst is in the historic part of the Connecticut Valley, surrounded by hills and mountains which possess such a natural beauty as to make the site of the College charming and inspiring.

The village is on the lines of the Central Massachusetts Division of the Boston and Maine, and on the Central Vermont Railroads. Electric cars pass the College and the stations, and connect the town with Northampton, Holyoke, and Springfield.

Entrance Requirements

The requirements for admission are of the same general standard as those of other New England colleges, and may be met in the following ways: (*a*) By examination; (*b*) by credentials of the Regents of the State of New York; (*c*) by a principal's certificate from an approved high school or academy; a certificate to be accepted must show in all subjects certified, the grade required by that school for certification to any college of recognized standing. High school diplomas are in no case accepted for entrance. Women are granted admission on the same conditions as men.

In the following outline, all subjects in group A, amounting to nine credits, are required. Enough more must be selected from group B to make the total of fourteen credits required for admission:

GROUP A (Required)	Credits
English	3
French or German	2
United States History and Civics	½
History (one of the following)	1
Ancient History	
Medieval and Modern History	
English History	
General History	
Algebra	1½
Plane Geometry	1
	9

GROUP B (Five Credits Must be Offered from this List.)	Credits
English in addition to requirements	1
French in addition to requirements	2 or 1
German in addition to requirements	2 or 1
Greek	2 or 3
Latin	2 or 3
History in addition to requirements	1 or 2
Solid Geometry	½
Trigonometry	½
Chemistry	1
Physiography	½
Physiology	½
Agriculture	½ or 1
Botany	½ or 1

Geology	½
Physics	1
Zoology	½
Commercial Geography	½
Drawing	½
Manual Training	½ or 1

The term "credit" means the equivalent of five recitations a week for a school year. Not more than four subjects of group B in which the credit sought is one-half unit, will be accepted.

Expenses

Probably the average student spends from $225 to $325 a year, although some get along with less, and others spend more. No charge for tuition is made to any citizen of the United States, hence the principal expenses are those for board, room, laundry, laboratory fees, military uniform, cost of books, assessments levied by the student body for the support of their different organizations, and miscellaneous personal expenses.

At present the College has two small dormitories, and these can accommodate but a small number of the students; the upperclassmen are given first choice

Dormitories and Play Ground

of rooms in these buildings. The rooms are nearly all arranged in suites of three, two men occupying a suite. The cost of these unfurnished rooms, steam heated and electric lighted, varies from $39 to $66 per year for each student. The question of largely increased dormitory facilities is being thoroughly considered by the Trustees.

Dining Hall

The majority of students are obliged to find rooms in the private houses located near the college grounds. Such rooms should be secured well in advance when possible, as the demand for them is great. These rooms are usually furnished either completely or in part, lighted, and heated. The rent is from $1.25 to $3.00 a week for each occupant.

Practically all the students eat at the college dining hall, where good board is at present furnished at $3.75 per week.

Corner of the Dining Hall

Self Help

A large per cent. of the men attending the Massachusetts Agricultural College are obliged to earn a part of their expenses, and several are entirely dependent upon their own resources for money to meet their college bills. The State provides a liberal fund to be used in payment for labor performed by needy students. The most desirable positions open to students, are given to those who have been in the College some time, so the new-comer cannot expect to earn as much during his first year as some of the older men are earning. A student should not attempt to enter until he has enough ready money to carry him through a good part of his first year, as it is practically impossible for him to pay all his expenses from the start and at the same time do satisfactory college work. In all cases, consideration has to be given to the efficiency as well as to the need of the individual applying for work. Some of the best students are selected to assist the College instructors in such work as theme reading or laboratory supervision.

Opportunities for vacation work frequently come to some of the students through the different departments of the College. This affords the men valuable experience in the lines of work they expect to follow, as well as aiding them financially.

Courses of Study

In the regular collegiate course covering four years, and leading to the degree of B. Sc., the work of the first two years is largely required, and that of the last two, practically all elective. This arrangement assures a graduate a broad, college education and at the same time thoroughly prepares him for a useful profession by presenting opportunity for extensive specialization in his chosen field of work.

The required work covers courses as follows:

In the Freshman Year:

- English,
- French or German,
- Algebra,
- Geometry and Trigonometry,
- Chemistry,
- Elementary Agriculture,
- Hygiene,
- Physical Education (Military Drill)

In the Sophomore Year:

- English,
- French or German,
- Physics,
- Surveying,
- Chemistry,
- Agriculture,
- Zoology,
- Geology,
- Botany,
- Horticulture,
- Physical Education, (Military Drill)

About one hundred and twenty five separate courses are offered by the following divisions and departments as electives for juniors and seniors:

- Agricultural Education,
- Agriculture:
  - Dairying,
  - Animal Husbandry,
  - Agronomy,
  - Farm Administration,
- Botany,
- Chemistry,
- Entomology,
- Horticulture:
  - Floriculture,
  - Forestry,
  - Landscape Gardening,
  - Market Gardening,
  - Pomology.
- Humanities:
  - English,
    - Language and Literature
    - Public Speaking,
  - French and Spanish,
  - German and Music.
  - Political Science.
- Mathematics:
  - Civil Engineering,
  - Physics.
- Physical Education,
- Rural Sociology,
- Veterinary Science,
- Zoology and Geology.

Not all the subjects taught can be treated with equal and complete thoroughness. The courses of certain departments are given an especially commanding place in the curriculum of the four years' program, and together with the studies on which less importance is laid, give a man an efficient preparation for a profitable livelihood.

The Dairy

The Department of *Agricultural Education* is a comparatively new one; its courses in Philosophy, Pedagogy, and Psychology are as yet not fully developed, but they aim to fit students for high school and college teaching, particularly along the lines of the natural sciences and technical Agriculture.

Agriculture is of course one of the most important branches of the College work, and plans are under way to develop the various agricultural departments in a very thorough and comprehensive manner. At present two professors, two instructors, and one lecturer are employed in

The Stable

this Division; their courses cover the topics of Agronomy, Animal Husbandry, Dairying, Farm Administration, Soils, and Fertilizers. The importance of practice as well as theory is recognized in these courses. To supplement the class room instruction, the farm of nearly two hundred acres, the thoroughly modern stable and dairy, the new barns, and the herd of cows, all contribute to the efficiency of the work.

One of the Laboratories of Clark Hall

Botany: This subject is exhaustively treated in courses in Cryptogamic Botany, Plant Pathology and Physiology, Economic Fungi, Histology, Morphology, and classification. Clark Hall is the home of this department; not only is this the largest instruction building now on the campus, but it is one of the best equipped botanical laboratories in the country.

Clark Hall, (Botany)

The *Chemistry* Department offers courses in Qualitative and Quantitative Analysis, Organic Chemistry, Physical Chemistry and Chemistry of Plant and Animal Life. Chemistry is one of the most important sciences related to that of Agriculture, and the necessity of a thorough training in this branch for agricultural students is fully realized.

Chemistry Building

Entomology: Nowhere in the United States are more thorough and complete courses in Entomology offered than at the Massachusetts Agricultural College. The fascinating topics of General and Economic Entomology, Insecticides and Apparatus, Morphology, and Histology, are all treated with skillful detail. This work has become so popular among the students, that the Department has outgrown its building, and there is now being erected a magnificent fireproof structure to be used by the Departments of Entomology and Zoology. A large number of men in the Graduate School take their major work in Entomology.

·DEPARTMENT·OF·ENTOMOLOGY·
MASSACHUSETTS·AGRICULTURAL·COLLEGE·AMHERST MASS
CLARENCE·P·HOYT·ARCHITECT·BOSTON

Architect's Drawing of Laboratory for Entomology and Zoology, (Now being erected)

Wilder Hall, (Horticulture)

Horticulture, with its branches of Pomology, Arboriculture, Floriculture, Market Gardening, Landscape Gardening, Plant Breeding, and Forestry, constitutes another very essential feature of the work at M. A. C. Six instructors and two instruction buildings are assigned to the work of this Division.

Wilder Hall, a fireproof building completed in 1906, contains recitation rooms for General Horticulture, Pomology, Forestry, and Landscape Gardening; also draughting rooms for the last. French Hall for Floriculture and Market Gardening is a recently erected building, and is connected with an extensive range of glass houses which represent the most modern ideas of construction, ventilation, heating, and lighting; these houses are used for the raising of the general greenhouse crops of New England. Lack of funds has made impossible the development of the work in Forestry; this difficulty has now been overcome, and a Professor of Forestry is being sought who will as soon as possible introduce several courses in practical

French Hall and Durfee Planthouses (Floriculture and Market Gardening)

Forestry; these courses will be open only to juniors and seniors; it is hoped that arrangements will be made with the professional schools of both Yale and Harvard to accept graduates of this department with large advanced credit.

Altogether, the work in Horticulture is perhaps as completely organized and thoroughly equipped as that in any college in the country.

Under the *Humanities* are grouped the departments of English, Modern Languages, and Economics. In English, a variety of courses is open, including reading courses, literary history, and the intensive study of great authors. Public speaking and debating are emphasized, and courses have been established in both general and agricultural journalism. In the modern languages, advanced courses are planned to meet the needs of those who wish to increase their literary or scientific knowledge of French, German, or Spanish. Valuable courses are offered in Political Science and Economics.

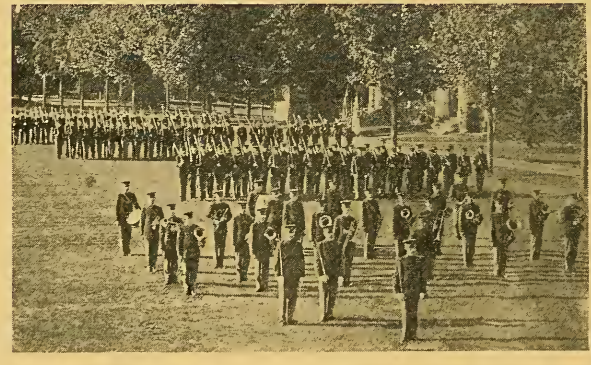
Veterinary Laboratory

Instruction in *Rural Sociology* is one of the unique features of the Massachusetts Agricultural College. Here the fundamental problems of Rural Social Science are studied, and some attempt made in helping to solve them. *Agricultural Economics* discusses the modern problems of transportation, marketing, etc., in relation to the business of Agriculture, from the standpoint of the political economist.

Courses in *Zoology* and *Geology* find an essential place in the required and elective studies. The work of these departments will become more comprehensive on the completion of the new laboratory.

Veterinary Science and *Mathematics and Physics* are taught in the regular four years' course, and also are offered as departments of the Graduate School.

Military Drill is required for three years and is



The Battalion

presented as an elective for the fourth year. This forms a part of the work in Physical Education. The Battalion is in charge of a retired United States Army officer, and the officers of the companies are appointed from the student body. The object of this work is to develop the men physically and to give them an adequate idea of military duty.

Short Courses

This Department has a much greater prominence than formerly in the general work of the Massachusetts Agricultural College. A Director of Short Courses has recently been secured and under his supervision the present work is being reorganized and new branches developed.

The *Winter School* offers practical courses in Dairying, Agriculture, and Horticulture. Large numbers of men for whom a regular college course is impossible, are able for ten weeks during the winter months to take advantage of these courses of practical instruction, and thus increase their earning capacity. No scholastic requirements are necessary for admission.

The *Summer School* has been exceptionally popular and successful since its first session in 1907. The courses are designed especially for teachers, clergymen, and other social workers.

The object of Short Course work is two-fold:

1. To bring to the College for instruction, as many people as can possibly be reached in this way, for a few days or a few weeks.

2. To disseminate by various methods, agricul-

tural information to the masses of people who cannot be brought to the College.

This mission is partly fulfilled in the work of the Winter and Summer Schools of Agriculture; the idea is to be further carried out by holding at the College "Farmers' Weeks," and Corn and Fruit Shows. Correspondence courses and traveling schools will add to the efficiency and value of the work. Lectures and object lessons before Granges, Farmers' Clubs, Boards of Trade, Y. M. C. A's., High Schools, and agricultural fairs, also constitute a part of the plan for the Short Course work.

Graduate School

College graduates may under prescribed conditions, enter the Graduate School. Advanced courses are offered in Agriculture, Botany, Chemistry, Entomology, Horticulture, Mathematics and Physics, Veterinary Science, and Zoology. The degrees of M. Sc. and Ph. D. may be earned in this School, one and one-half years of study being required for the former, and three years for the latter.

There is always such a large demand for agricultural experts with the special training which these advanced degrees imply, that there is generally an attractive position waiting for the men who complete the work of this Graduate School.

Unclassified Students

To make it possible for mature men and women who cannot spend four years at college, to receive some training in the branches of the work at M. A. C. which particularly interest them, unclassified students are admitted. Such applicants must be at least twenty-one years of age; must present certificates showing that they have finished a four years' high school course or its equivalent; and after entering, must comply with certain other regulations designated by the faculty.

The Experiment Station

The Agricultural Experiment Station of Massachusetts is located on the grounds of the Agricultural College, and forms a part of that institution. The research laboratories, and the experimental plots and laboratories give the students an opportunity to become familiar with the methods and results of the scientific work of this important department. Students fitting themselves for employment as Experiment Station officers are especially fortunate in

(Chemistry) Experiment Station Buildings (Agriculture) thus being able to associate with experts in their own chosen profession, and in coming in close personal touch with their work.

Student Organizations

The student organizations are not unlike those in other New England colleges. In 1907 the M. A. C. Social Union grew out of a desire on the part of the students and faculty to effect some definite organization which should promote the social life of the students, officers, and alumni of the College, and unite them in a strong fellowship. The College has renovated and given over to the Union the first floor of one of the dormitories; this is used for a reading and lounging room, and has a trophy room adjoining. For three years the students have paid a small tax, and this has been used to buy a piano, furniture, and other fittings for the Union rooms.

Social Union Room

Entertainments free to students and the College officers are frequently held Saturday evenings during

The Trophy Room

the winter months. It is intended to make the Union the head of all student activities, and the rooms the center of the social and good-fellowship spirit of the College community.

The Y. M. C. A. endeavors to promote a manly Christian atmosphere among all the students. The work is under the general supervision of a Graduate Secretary.

Athletic relations are maintained with Dartmouth, Williams, Brown, Amherst, Springfield Training School, University of Vermont, and several other New England colleges. Football, base ball, track, hockey, and tennis are the principal sports followed. At present the athletic association does not have an enclosed field; land for this purpose has however, recently been purchased, and as soon as possible money will be provided by the alumni to equip the field. In connection with the enclosed field, a large recreation ground will be opened.

Relay Team, 1908-1909

Football Squad, 1908

A musical association comprising a glee club, orchestra, and a mandolin club, offers attractions to men with musical interests and talent. A college band is maintained in connection with the Military Department of the College.

The students have also organized a rifle club, a debating club, and several professional clubs, chiefly in the departments of Agriculture, Chemistry, Entomology, and Horticulture.

Secret societies play an important part in the student life of the College. There are five such organizations, two of them being branches of national Greek letter fraternities.

Social activities are controlled by committees elected by the students.

The Band

A Student's Room

M. A. C. Alumni

The value of a college can well be estimated by the achievements of its graduates. The M. A. C. alumni are scattered all over the globe, though the first class graduated less than forty years ago. As agricultural experts, botanists, chemists, and entomologists, M. A. C. graduates are in such demand by the Government and by private corporations that only a comparatively few of the positions can be filled by these men. In practical work also, the graduates are sought as landscape gardeners and superintendents of farms and estates.

Many alumni have made their collegiate course at the Agricultural College a preparation for study in medicine, law, or theology; and some of these have attained eminent success in such pursuits.

The alumni list also contains the names of at least two college presidents; more than a score of prominent college teachers and Experiment Station officials; and numerous well known business organizers and civil engineers.

In rural communities in all parts of the United States are found M. A. C. graduates successfully following the life of the practical farmer, and exerting a wholesome leadership in educational, social, and political movements, as well as imparting scientific agricultural information by the example of their own methods.

With the awakening of the masses of people to the importance of industrial education, graduates of the Massachusetts Agricultural College are being demanded not only in New England, but all over the United States to fill positions as teachers of elementary Agriculture and the Sciences in high schools and academies.

In the unexplored fields of experimentation and research; in the employ of Federal and State Boards of Agriculture; in agricultural journalism; and in agricultural business enterprises, there are still almost unlimited opportunities and possibilities for alert, energetic young men with a training such as is supplied by the Agricultural Colleges of the country. Large numbers of M. A. C. alumni are personally realizing some of these opportunities.

Technical training is becoming popular because its necessity has been demonstrated and its worth recognized. The Agricultural College of Massachusetts is becoming more intelligently known and properly appreciated by the people of New England.

Graduates of this and other institutions of like character are becoming the real problem-solvers of the day, because they have been educated and trained not alone in culture studies, but also in courses of technique and practice.

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CIRCULAR
OF
SHORT COURSES

A VIEW ON THE CAMPUS

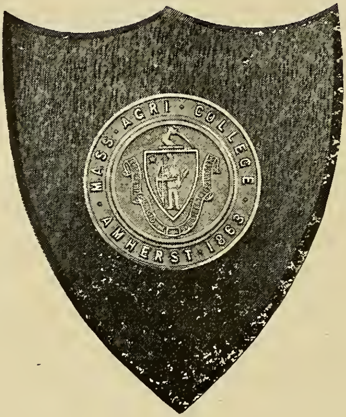
Published six times a year by the Massachusetts Agricultural College: January, February, March, May, September, October.

Entered as second-class matter at the postoffice at Amherst, Mass.

SHORT COURSES FOR 1910

OF

Massachusetts Agricultural College



Ten weeks' General Course: Agriculture, Horticulture, Animal Husbandry, Dairying, Floriculture, Market Gardening, and Veterinary Science.

January 4th to March 11th.

Two weeks' course in Poultry Management—

February 28th to March 11th.

Farmers' Week—

March 14th to 18th, inclusive.

Bee Keeping Course—

May 25th to June 8th.

Summer School—

Begins July 5th.

ANNOUNCEMENT

The short winter courses at the Massachusetts Agricultural College are offered to meet the needs of those, both young and old, who want to study principles and modern methods in agriculture, and who for various reasons are unable to attend the four year courses. The work will begin Tuesday, January 4th, 1910, and closes on Friday, March 11th, and is planned to bring before the student the results of the latest investigations in agricultural science, and to point out their practical application.

During the last two weeks of the ten weeks' course, a short course in Poultry Management will also be conducted. The dates are February 28th to March 11th.

Following the close of these short courses, a farmers' week will be held. The dates of this are March 14th to 18th.

The Bee Keepers' Course will be given from May 25th to June 8th.

Circulars fully descriptive of Farmers' Week, the Poultry Course, and Bee Keepers' Course will be issued later.

Instruction will be given by the regular faculty of the college by means of lectures, recitations, laboratory and practicum work; from time to time they will be assisted by non-resident lecturers on special subjects. The work in the class-room will be supplemented by demonstration work in the laboratory, dairy room, greenhouse and stables. The library of over 30,000 carefully selected volumes offers exceptional opportunities for special study in agriculture, horticulture, and related sciences.

Students will be required to elect courses to make not more than twenty nor less than twelve exercises each week. The arrangement of courses is such that students must follow certain lines of work. Those electing Dairy Industry, Floriculture, or Horticulture, must also take courses in allied subjects as noted in the description of these courses. In general agriculture more latitude is allowed, but it is expected that students will show a definite purpose in the selection of work. All elections, as well as any deviation from the regular rule, must be approved by the Director in charge of the short courses.

THE TEN WEEKS' GENERAL COURSE

January 4th—March 11th, 1910

FACULTY

Kenyon L. Butterfield—President and Professor of Rural Sociology.
Alexander E. Cance—Instructor in Agricultural Economics.
E. K. Eyerly—Assistant Professor of Political Science, Lecturer Rural Sociology.
Henry T. Fernald—Professor of Entomology.
James A. Foord—Professor of Farm Administration.
E. H. Forristall—Farm Superintendent.
Charles R. Green—Librarian.
Ray L. Gribben—Instructor in Animal Husbandry.
William R. Hart—Professor of Agricultural Education.
Sidney B. Haskell—Instructor in Agronomy.
William D. Hurd—Director of Short Courses.
Harry H. Jennison—Assistant in Botany.
William P. B. Lockwood—Assistant Professor of Dairying.
Robert W. Lyman—Lecturer on Farm Law.
James B. Paige—Professor of Veterinary Science.
Fred C. Sears—Professor of Pomology.
George E. Stone—Professor of Botany.
John N. Summers—Assistant in Entomology.
Harold F. Tompson—Instructor in Market Gardening.
Newton Wallace—Electrician.
Edward A. White—Professor of Floriculture.

NON-RESIDENT LECTURERS

The work of the regular faculty will be supplemented each week by non-resident lecturers. These will usually be practical men who have made marked success in their chosen fields of work. A partial list is given below:

George A. Drew, Greenwich, Connecticut.
J. H. Hale, South Glastonbury, Connecticut.
Charles E. Lyman, Middlefield, Connecticut.
C. L. Gold, Middlefield, Connecticut.
Wilfred Wheeler, Concord, Massachusetts.
A. McNeill, Chief of Fruit Division, Ottawa, Ontario.
Clark Allis, Medina, New York.
H. L. Frost, Arlington, Massachusetts.
E. O. Orpet, South Lancaster, Massachusetts.
Peter Fisher, Ellis, Massachusetts.
W. H. Elliot, Brighton, Massachusetts.
Eber Holmes, Montrose, Massachusetts.
M. A. Patten, Tewksbury, Massachusetts.
E. McMulkin, Boston, Massachusetts.

COURSES OF INSTRUCTION

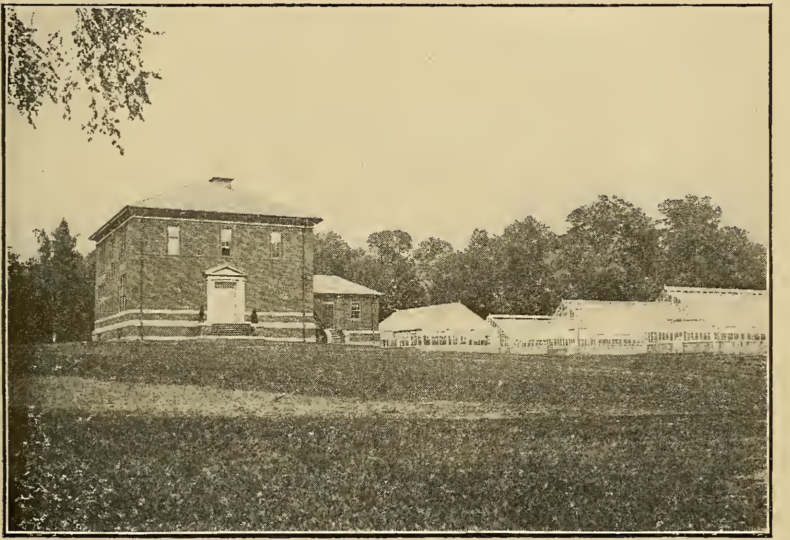
1. Soil Fertility. PROFESSOR WM. D. HURD.

The nature of soils, their chemical and physical properties. The improvement of "run down" land. Tillage. Green manuring. Crop rotation. Drainage. Stable manures, their value, composition, preserving and application. Commercial fertilizers, their nature. Materials which furnish the different elements. Fertilizers for different crops, the duplication of formulae. Lime and liming. Three exercises a week for ten weeks.

2. Horticulture.

A. Market Gardening. MR. H. F. TOMPSON

A general survey of the market gardening business, together with a study of the most important problems involved, such as location, soils, fertilizers, crops, systems of cropping, markets and marketing. Three exercises each week for ten weeks.



THE NEW GREENHOUSE AND MARKET GARDENING PLANT

B. Fruit Growing. PROFESSOR F. C. SEARS.

The work in this course will deal with the practical side of the growing and marketing of fruits. Especial attention will be given to such questions as selection of site for the plantation, choice of varieties, grafting and budding, spraying, pruning, cultivation and cover crops, fertilizing the fruit plantation, packing and marketing. Lectures, supplemented with demonstrations, and, wherever possible, actual work by the students. Five exercises each week for ten weeks.

Students electing Horticulture will also be required to take Course 1, and it is recommended that they take Courses 10 and 11.

3. Floriculture.

PROFESSOR E. A. WHITE.

This course is outlined with the idea of furnishing young men who have not the time to devote to a longer course, with the theoretical and practical considerations which are essentials for success in Floriculture. The course will cover, as thoroughly as time will permit, those aspects of the work of special interest to the grower. Some of the topics to be considered are greenhouse construction, greenhouse details, such as ventilators, gutters, benches, etc., greenhouse furnishings, and equipment, heating, florists' crops and florists' trade.

STUDENTS BUDDING NURSERY STOCK

In addition to the regular lecture work of the course, it is expected that lectures will be given by experts in growing special crops, such as roses, carnations, violets and orchids. The co-operation of several of the most up-to-date florists has been secured for these lectures. Five exercises each week.

Students electing this course will also be obliged to take Courses 1, 10 and 11.

4. Field Crops.

MR. S. B. HASKELL.

The production of field crops for New England; species and varieties, agricultural characteristics, methods of culture, rotations, harvesting and curing. The laboratory work will give the student practice in seed selection and testing for quality, purity and germination, and in corn and potato judging. Three exercises each week for ten weeks. See Course 1.

A GOOD TRACE OF CORN

5. Breeds of Live Stock and Animal Breeding.

MR. R. L. GRIBBEN.

A study of the characteristics and development of our modern breeds of live stock and their adaptation to New England conditions; special attention will be given to dairy cattle. The principles of breeding and the methods of improving farm stock. One exercise a week will be devoted to stock judging. Three exercises each week.

6. Live Stock Feeding and Management.

MR. R. L. GRIBBEN.

The character and composition of feeding stuffs, and their action and influence upon the animal body and production. Practice in compounding rations. The principles and practice of the feeding, care and management of live stock. Two exercises each week.

7. Animal Diseases and Stable Sanitation. Doctor J. B. Paige.

Lectures upon some of the common diseases of live stock, giving special attention to methods of prevention, care, and sanitation. The treatment of emergencies and accidents. How to keep animals healthy. Two exercises each week.

8. Dairying. Professor W. P. B. Lockwood, and assistants.

Milk and milk production, creaming methods. Babcock and acid tests. Methods for testing individual cows. Milk handling for local markets. Ripening cream and butter-making. Dairy buildings, lighting, ventilation and sanitation. Three one-hour and (2 two-hour) (2 three-hour) periods. Course limited to 32 students, owing to lack of laboratory accommodations.

SHORT COURSE STUDENTS STUDYING DAIRY CATTLE

9. Dairy Bacteriology. Professor W. P. B. Lockwood.

The characteristics and functions of bacteria and their relation to the different branches of the dairy industry. The scientific basis for cream ripening, sterilization, pasteurization, control of fermentation and the production of the best quality of market milk. Two exercises each week.

10. Botany. PROF. G. E. STONE and MR. HARRY M. JENNISON.

A study of the structure, function and diseases of greenhouse, garden, orchard and field crops, together with methods of prevention, including spraying and the application of fungicides. One period each week will be devoted to laboratory work. Three exercises each week.

11. Entomology. PROF. H. T. FERNALD and MR. J. N. SUMMERS.

A study of the insects causing most injury to farm, orchard, garden and greenhouse crops, and methods for their destruction or control. Animal parasites and their prevention. Three exercises each week.

A LESSON IN SPRAYING

12. Mechanics. PROFESSOR W. P. B. LOCKWOOD and MR. WALLACE.

Care of boilers, engines and dairy machinery, installing and lining shafts and pulleys; calculating speeds of pulleys, etc. Cement foundations and floors. Plans for farm and dairy buildings. One exercise of two hours each week.

13. Farm Accounts. PROFESSOR J. A. FOORD.

Practical work in keeping farm accounts and records. A simple system by which profits and losses of the farm may be traced to their original sources. One exercise each week.

14. Farm Buildings and Machinery.

PROFESSOR J. A. FOORD and MR. E. H. FORRISTALL.

Location and planning of farm buildings and water supply, and the construction, care and operation of farm machinery. One period a week for ten weeks.

Lectures Pertaining to Rural Betterment

In order that those who attend the ten weeks' course may receive instruction in some topics of vital interest to rural communities, as well as along the so-called more practical agricultural lines, several lectures will be given throughout the course on the subjects, and by the lecturers as given below. The time will be arranged so that these will not conflict with other exercises.

Rural Sociology,	President Butterfield and Professor Eyerly.
Rural Education,	Professor W. R. Hart.
Rural Economics,	Prof. Alexander E. Cance.
Farm Law,	Judge Robert W. Lyman.

The Stockbridge Club is a student organization which holds meetings every week for the discussion of agricultural and horticultural affairs. Its meetings are often addressed by well-known specialists. Membership is open to students of the short courses.

Assembly. All students of the college are required to attend a weekly assembly, at which an address of general interest is usually given. Attendance at morning chapel service, four times each week, is also required.

EXPENSES

The expenses of attending either of the short courses will be about as follows:

Tuition to citizens of the United States,	Free
Furnished rooms in private families per week,	$1.00—$3.00
Board at College Dining Hall per week,	$3.75
Board in private families per week,	$4.00—$5.00
Laboratory breakage at cost, not to exceed	$5.00
Books,	$5.00—$10.00

Students in either of the dairy courses must provide themselves with two white wash suits and a white cap for use in the practical dairy work. The cost in Amherst is about $1.25 for suit and cap.

PRIZES

Through the kindness of friends of the college, the following prize is offered to students in the ten weeks' course:

By the Bowker Fertilizer Co. One-half ton of Stockbridge fertilizer to the student who is the most familiar with the nature and composition of fertilizers and their use.

REQUIREMENTS FOR ADMISSION

No entrance examinations are required, but students are advised to review their school work in English and arithmetic before entering. Practical experience in farm, garden, orchard or greenhouse work will be an advantage. The courses are open to both men and women.

Students must be at least 18 years of age, and must furnish satisfactory evidence of good moral character.

Application for admission should be made as early as possible, on the card enclosed with this circular. Limited accommodations in the Dairy Laboratory make it necessary to limit this work to thirty-two. Students will be accepted in this course in the order in which their application is received.

Students should report to the professor in charge on Monday, January 3d, 1910, in order to begin work promptly on the morning of January 4th.

Enclosed is a registration card. Fill this out and return at once in order to insure your having a place in the courses in which it is necessary to limit the numbers.

THE SHORT COURSE IN POULTRY MANAGEMENT

February 28th—March 11th, 1910.

This course will be of the most practical nature, and it is given at the request of a large number of poultrymen of the State. Some of the leading experimentalists and practical poultrymen will be engaged to carry on the work.

The subjects covered will include poultry house construction, incubation and care of young chicks, feeding poultry for egg production and for market, preparation for market, killing and dressing, caponizing, practice in scoring, judging and selecting fowls for show and utility purposes, the production of feeds for poultry, small fruits and vegetables as adjuncts of the poultry business, and the practical business problems of the poultryman.

No tuition will be charged. Send for descriptive circular about January 1st.

FARMERS' WEEK

March 14th—18th, 1910.

In order to reach those who cannot come to the college for a longer time, this very practical course, four days in length, will be given. The regular college equipment will be used, and the work of the regular faculty will be supplemented by lectures and demonstrations given by eminent men.

The work will be divided into three sections: (1) General Agriculture, to include Farm Management, Farm Crops, Dairying, Animal Breeding and Feeding, Veterinary Science and Bacteriology; (2) Horticulture, to include Fruit Growing, Market Gardening, Floriculture and Forestry; (3) Farmers' Wives' Section, including lectures and demonstrations in Home Economics, Cookery and problems of home making.

Features of the week will be the evening lectures by specialists along agricultural lines, the conferences pertaining to problems of rural betterment, aside from practical agricultural topics, a corn and grain show, and others.

Complete program will be published and sent on request later.

COURSE IN BEE KEEPING

May 25th—June 8th, 1910.

The college has recently come into possession of a number of swarms of bees which, with the other equipment to be added, will afford a fine opportunity for those interested to get some practical information on this subject.

The course will be given by Doctor William P. Brooks, Director of the Massachusetts Agricultural Experiment Station, Doctor James B. Paige, both experts, and of long experience in bee keeping, and Doctor Henry T. Fernald, Professor of Entomology. Besides these named, an expert will be engaged for the practical field work.

A circular will be issued later.

THE SUMMER SCHOOL OF 1910

ANNOUNCEMENT

The Summer School of Agriculture of Massachusetts Agricultural College will open July 5th, 1910, for a term of six weeks. This will be the fourth session of this Summer School, those of 1907, 1908 and 1909 having been highly successful. The experience of these three years will aid in making material improvements in the session of 1910.

The work of the Summer School was designed originally for school teachers, and the attendance has been largely of that class. Special attention will be given to the needs of teachers again this year. It has been found, however, that there are many persons who seek a general knowledge of theoretical and practical agriculture and who can come to the college conveniently during the summer season. Extended courses will be offered for the benefit of such persons also.

AN OUTDOOR LESSON IN THE SUMMER SCHOOL

The work offered for the current year may be somewhat roughly grouped as follows:

1. Courses in practical agriculture and horticulture.
2. Courses in elementary sciences bearing on agriculture and horticulture.
3. The elements of Home Economics for rural school teachers.
4. Courses in agricultural education.
5. Courses in agricultural economics and rural sociology.
6. Conferences for clergymen, school superintendents and others.
7. Evening lectures by eminent educators.
8. Excursions to various points of interest in the vicinity.

From these courses it will be possible to make up programs of work suitable to the needs of almost every one, but especially to school teachers, principals, superintendents, school committeemen, farm owners, householders, suburban residents, clergymen, pastors, preachers, social workers, and those who have only a general interest in agriculture. Persons who are in doubt as to what courses will best suit their needs would better correspond with the Director of Short Courses, who will gladly advise in all such matters.

GENERAL PLANS

The formal instruction in the Summer School is given in about twenty definite courses. From these, each pupil may elect courses providing not less than ten nor more than fifteen exercises a week, unless a larger or smaller amount of work be allowed by the Dean. These courses include a large amount of field work, observation trips, outdoor exercises and laboratory experiments.

Besides these, general field exercises will be arranged for one afternoon of each week. These will be on topics of interest to all. Class excursions will be arranged for every Wednesday afternoon, and more extended excursions for the whole school will be planned for every Saturday. These excursions will be personally conducted by members of the faculty, as heretofore. In the past they have proved a very enjoyable feature of the work.

Round tables and special discussions will be arranged by various instructors as their courses require.

A course of evening lectures on popular topics relating to the work of the school will be a feature of the general program. Several able lecturers have already been engaged for this course. Like everything else connected with the Summer School, this lecture course is entirely free to all students.

The expenses are low. Amherst is situated in one of the most noted historical and educational centers in this country. Any one interested in problems pertaining to country life should not fail to attend. A descriptive circular can be had February 1st, 1910.

HELPS FOR THOSE WHO CANNOT COME FOR ANY OF THE SHORT COURSES

LECTURE COURSES AND OBJECT LESSONS

The public lecture work of the faculty is now being systematized. Granges, Farmers' Clubs, Young Men's Christian Associations, Boards of Trade, Women's Clubs, Village Improvement Societies and other organizations can secure lectures covering agriculture and allied subjects, either singly, or courses of several lectures can be arranged. Practical object lessons, such as spraying, milk testing, stock judging, mixing fertilizers, fruit grading and packing, and others of a similar nature, will also be given when application is made for them. Organizations named above can arrange with the college to have a series of evening meetings, at which agricultural subjects and topics pertaining to rural life will be presented in a popular way. It should be understood that the number of men available for this work is at present limited; hence early application is desirable.

CORRESPONDENCE COURSES

So many calls have come to the college for lessons by correspondence that courses in Agriculture, Horticulture, Dairying, Animal Industry, Poultry Raising, Farm Bookkeeping, and others, are being prepared and will be ready for the coming winter. They will be offered to individuals, or classes may be organized in Granges, Young Men's Christian Associations, or other organizations.

Very small fees, to cover cost of postage and books, will probably be charged.

Application for admission to the short courses, the correspondence courses, to secure lectures, or any other information concerning them should be addressed to

WILLIAM D. HURD, Director,
Massachusetts Agricultural College,
Amherst, Mass.

The Massachusetts Agricultural College offers full undergraduate courses in the different lines of Agriculture, Horticulture, Chemistry, Botany, Entomology, Veterinary Science, Bacteriology, Forestry and other sciences. For catalogue and other information address the President,

KENYON L. BUTTERFIELD,
Amherst, Mass.